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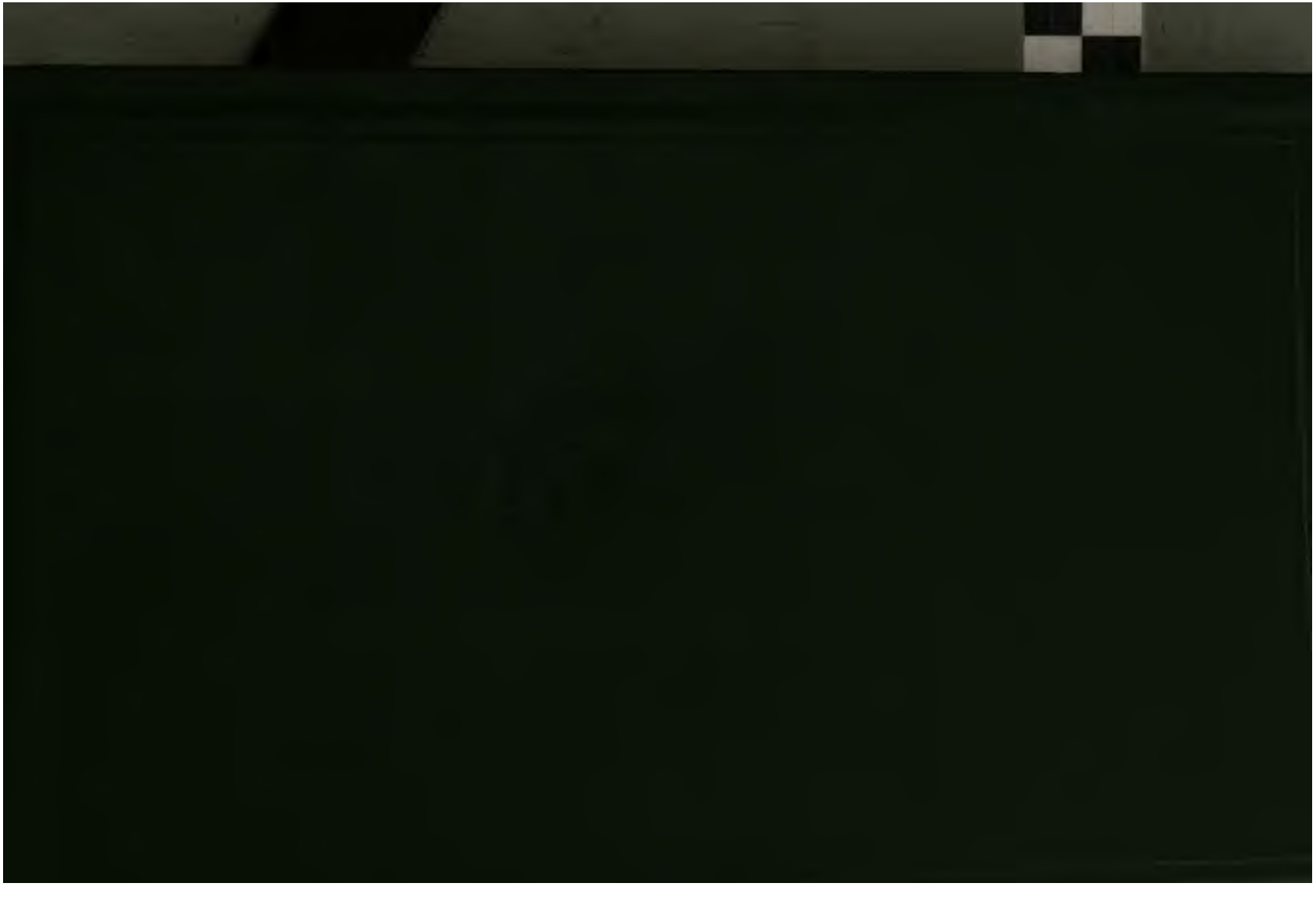

TRANSACTIONS

OF THE

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS

VOL. XXIX

FOR THE YEAR 1916

Edited by E. GUSTAV ZINKE, M.D., F.A.C.S.
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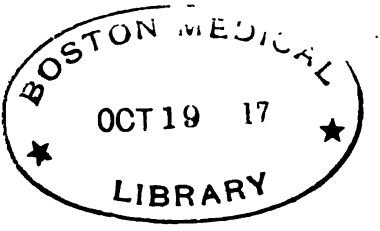
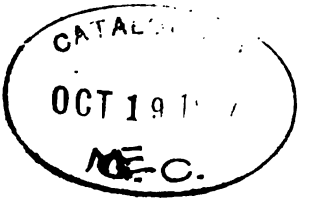
1917





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NOTE.

The Association does not hold itself responsible for the views enunciated in the papers and discussions published in this volume.

DR. E. GUSTAV ZINKE, *Secretary*,
4 W. SEVENTH AVENUE, CINCINNATI.

[Minutes and discussions stenographically reported by WILLIAM WHITFORD, Chicago, Ill.]

LIST OF ILLUSTRATIONS.

	Page
Appendicular Abscess. (Magnus Tate.)	6
Rupture of Uterine Scar. (A. J. Rongy.)	34
Blood-pressure Picture during an Hysterectomy. (Chas. W. Moots.)	75
Blood-pressure Picture during Great Shock. (Chas. W. Moots.)	76
Shortening the Round Ligaments. (Sigmar Stark.)	165–171
Vestibular Ducts and Glands. (James E. Davis.)	180–198
Cautery with Thermometer. (J. F. Percy.)	214
Pictures from the Animated Drawing Film. (W. J. Brownlow.)	232
Bismuth-filled dilated Rectum. (John W. Keefe.)	273
Barium filling Diverticula. (John W. Keefe.)	274
Barium Enema. (John W. Keefe.)	275
Glass Tube with Bulb, and feeding Cup. (J. F. Baldwin.)	280
Cutting and ligating Ligament. (J. F. Baldwin.)	281
Ligating uterine Artery. (J. F. Baldwin.)	282
Peritoneum incised above uterosacral Ligaments. (J. F. Baldwin.)	283
Uterus pulled backward. (J. F. Baldwin.)	284
Opening Vagina in front. (J. F. Baldwin.)	285
Final Detachment of Uterus from Vagina. (J. F. Baldwin.)	285
Implanting round Ligaments into Vagina. (J. F. Baldwin.)	286
Both round Ligaments implanted. (J. F. Baldwin.)	287
Purse String tightened. (J. F. Baldwin.)	288
Chronic intestinal Stasis. (Wm. Seaman Bainbridge.)	308–314
Positions of the Vertex. (George A. Peck.)	377–381
Portrait of Ap Morgan Vance, M.D. (Louis Frank.)	392
Portrait of Nathan Jenks, M.D. (W. P. Manton.)	396
Portrait of Frank De Los Gray, M.D. (Gordon K. Dickinson.)	398
Portrait of John Benjamin Murphy, M.D. (Channing W. Barrett.)	402

CONTENTS.

	Page
Constitution	xi
By-laws	xv
Officers for 1916–1917	xix
List of Officers	xxi
List of Honorary Fellows	xxiii
List of Honorary Fellows, Deceased	xxvii
List of Corresponding Fellows	xxix
List of Senior Fellows	xxxi
List of Ordinary Fellows	xxxiii
List of Ordinary Fellows, Deceased	liii
List of Ordinary Fellows, Classified	lv
Minutes of the Twenty-ninth Annual Meeting	lix
President's Address. By Hugo O. Pantzer, M.D., A.M., F.A.C.S.	1
Appendicular Abscess, Complication, Hemorrhage, Followed by Death. By Magnus Tate, M.D., F.A.C.S.	5
Drainage for Pus Conditions in the Pelvis during Pregnancy. By Francis Reder, M.D., F.A.C.S.	8
Report of a Case of Rupture of the Uterus; Sepsis; Operation; Recovery. By Rufus B. Hall, A.M., M.D.	15
Rupture of the Uterus in Cesareanized Women, with a Review of the Literature on this Subject to Date. By John Norval Bell, M.D., F.A.C.S.	24
Rupture of the Cesarean Scar. By A. J. Rongy, M.D., F.A.C.S.	28
Postmortem Cesarean Section. By O. G. Pfaff, M.D.	42
Gunshot Wounds of the Abdomen in Pregnant Women. By Lewis F. Smead, M.D., F.A.C.S.	48
Teaching Obstetrics under improved Conditions. By Henry Schwarz, M.D.	58
Lymph Gland Extract. Its Preparation and Therapeutic Action. By David Hadden, M.D., F.A.C.S.	67
Observations on Blood Pressures during Operations. By Chas. W. Moots, M.D.	74
Points in the Diagnosis of Pelvic Troubles. By J. H. Carstens, M.D., F.A.C.S.	81
Considerations in the Care of our Patients before and after Operation. By H. Wellington Yates, M.D., F.A.C.S.	85
Operative Judgment as a Factor in Surgical Mortality and Morbidity. By Roland E. Skeel, M.D.	92
Removal of the Appendix for the Cure of Trifacial Neuralgia and other Nerve Pain about the Head and Face. By Maurice I. Rosenthal, M.D.	111
Fibromyomata Uteri and cardiovascular Disease. By Ben. R. McClellan, M.D.	118
Prolapse of the Uterus in nulliparous Women. By Palmer Findley, M.D., F.A.C.S.	129
Radium—A Palliative. By D. C. Moriarta, Ph.G., M.D., F.A.C.S.	138
The Standardization of definite Procedures during gynecological Operations. By E. A. Weiss, M.D., F.A.C.S.	145
A Modified Gilliam Operation and its ultimate Results. By Albert Goldspohn, M.D., F.A.C.S.	156

PAGE

Shortening of the Round Ligaments by transverse suprapubic Incision. By SIGMAR STARK, M.D., F.A.C.S. 165
The Pathology of the major vestibular Ducts and Glands. By JAMES E. DAVIS, A.M., M.D 177
Heat as a Method of Treatment in some Forms of cavity Carcinoma. By J. F. PERCY, A.M., M.D., F.A.C.S 207
The surgical Treatment of uterine Cancer. By J. H. JACOBSON, M.D., F.A.C.S. 218
Practical Consideration of Surgery of the Stomach. By GEORGE W. CRILE, M.D., F.A.C.S. 226
Applying the animated Drawing to the Teaching of surgical Technic. By WILLIAM J. BROWNLOW 231
The Mechanics of the Stomach after Gastroenterostomy. By J. H. JACOBSON, M.D., F.A.C.S. AND JOHN T. MURPHY, M.D 234
Value of Pain, Jaundice, and Tumor Mass in the differential Diagnosis of Diseases of the right upper Quadrant of Abdomen. By J. D. S. DAVIS, M.D., F.A.C.S. 246
Excessive Drainage complicating Surgery upon the common Bile Duct. By J. E. SADLIER, M.D., F.A.C.S. 258
Diverticulitis of the descending and pelvic Colon. By JOHN W. KEEFE, M.D., LL.D., F.A.C.S. 268
The Technic of abdominal Hysterectomy. By J. F. BALDWIN, A.M., M.D., F.A.C.S. 280
Inguinal Hernia attached to Cord, undescended Testicle, Uterus Tubes, and Broad Ligaments. By EDMUND D. CLARK, M.D., F.A.C.S . . 290
Absence of muscular Tone an important etiological Factor in postoperative Ileus. By R. R. HUGGINS, M.D 296
Chronic intestinal Stasis—Some Case Reports. Series I. By WM. SEAMAN BAINBRIDGE, A.M., SC.D., M.D., C.M 303
Tuberculous Glands of the Mesentery. By ARTHUR T. JONES, M.D. . . 318
The Relation of so-called Ether Pneumonia to pelvic and abdominal Surgery. By WM. EDGAR DARNALL, A.M., M.D., F.A.C.S 328
Hospital Management. By GORDON K. DICKINSON, M.D. 337
The Surgeon's Responsibility to the Economics of the Hospital. By EMERY MARVEL, M.D., F.A.C.S. 342
Goiter and Pregnancy. By ANDRÉ CROTTI, M.D., LL.D., F.A.C.S. . . . 353
Is the Operation of Cesarean Section indicated in the Delivery of Breech Presentation? By ROSS MCPHERSON, M.D., F.A.C.S. 359
The interposition Operation of Watkins-Wertheim in the Treatment of Cystocele and Prolapsus Uteri. By LOUIS FRANK, M.D., F.A.C.S. . . . 363
Postpuerperal Sterility—Its Cause and surgical Treatment. By H. S. LOTT, M.D. 368
Strangulated ovarian Cyst simulating Appendicitis. By EDGAR A. VANDER VEER, M.D. 371
Digital Rotation in occipitoposterior Positions of the Vertex. By GEORGE A. PECK, M.D., F.A.C.S. 376
Observations on premature Separation of the normally situated Placenta in the latter Months of Pregnancy. By LUCIUS A. WING, M.D . . . 384
In Memoriam. Dr. Ap Morgan Vance. By LOUIS FRANK, M.D., F.A.C.S. 392
In Memoriam. Dr. Nathan Jenks. By W. P. MANTON, M.D., F.A.C.S. . 396
In Memoriam. Dr. Frank De Los Gray. By GORDON K. DICKINSON, M.D., F.A.C.S. 398
In Memoriam. Dr. John Benjamin Murphy. By CHANNING W. BARRETT, M.D., F.A.C.S. 402

CONSTITUTION AND BY-LAWS

OF THE

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS

TOGETHER WITH

MINUTES OF THE TWENTY-NINTH ANNUAL MEETING

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS.

CONSTITUTION.

I. The name of this Association shall be THE AMERICAN ASSOCIATION OF OBSTETRICIANS AND GYNECOLOGISTS.

II. Its object shall be the cultivation and promotion of knowledge in whatever relates to Abdominal Surgery, Obstetrics, and Gynecology.

MEMBERS.

III. The members of this Association shall consist of Ordinary Fellows, Honorary Fellows, Corresponding Fellows, and Senior Fellows.

The Ordinary Fellows shall not exceed one hundred and fifty in number.

The Honorary Fellows shall not exceed ten American and twenty-five foreign.

Candidates shall be proposed to the Executive Council at least one month before the first day of meeting, by two Fellows, and shall be balloted for at the annual meeting, a list of names having been sent to every Fellow with the notification of the meeting.

A two-thirds vote in the affirmative of all the members present shall be necessary to elect—fifteen Fellows at least being in attendance.

All candidates for active fellowship shall submit to the Executive Council, at least one month before the annual meeting, an original paper relating to Abdominal Surgery, Obstetrics, or Gynecology.

HONORARY FELLOWS.

IV. The power of nominating Honorary Fellows shall be vested in the Executive Council.

Their election shall take place in the same manner as that of Ordinary Fellows.

They shall enjoy all the privileges of Ordinary Fellows, excepting to vote or hold office, but shall not be required to pay any fee.

CORRESPONDING FELLOWS.

V. The Corresponding Fellows shall be recommended by the Executive Council and elected by the Association.

They shall enjoy all the privileges of Ordinary Fellows, excepting to vote or hold office, and shall be entitled to a copy of the annual TRANSACTIONS.

They shall pay an annual fee of five dollars.

SENIOR FELLOWS.

Senior Fellows shall be nominated by the Executive Council, and elected by the Association as provided for in the election of Honorary Fellows, and they shall enjoy the same privileges as are accorded Corresponding Fellows.

OFFICERS.

VI. The officers of this Association shall be a President, two Vice-Presidents, a Secretary, a Treasurer, and six Executive Councillors.

The nomination of all officers shall be made in open session at the business meeting, and the election shall be by ballot.

The first five officers shall enter upon their duties immediately before the adjournment of the meeting at which they shall be elected, and shall hold office for one year.

"At the election next succeeding the adoption of these laws, the full number of Executive Councillors shall be elected; two for a term of three years, two for a term of two years, and two for a term of one year.

"At every subsequent election two Councillors shall be elected for a term of three years, and shall continue in office until their successors shall have been elected and shall have qualified."[1]

Any vacancy occurring during the recess may be filled temporarily by the Executive Council.

ANNUAL MEETINGS.

VII. The time and place of holding the annual meeting shall

[1] Amendment adopted September 21, 1898.

be determined by the Association or may be committed to the Executive Council each time before adjournment.

It shall continue for three days, unless otherwise ordered by vote of the Association.

AMENDMENTS.

VIII. This Constitution may be amended by a two-thirds vote of all the Fellows present at the annual meeting: *provided*, that notice of the proposed amendment shall have been given in writing at the annual meeting next preceding: and *provided, further*, that such notice shall have been printed in the notification of the meeting at which the vote is to be taken.

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS.

BY-LAWS.

THE PRESIDING OFFICER.

I. The President, or in his absence, one of the Vice-Presidents shall preside at all meetings, and perform such other duties as ordinarily pertain to the Chair.

The presiding officer shall be *ex-officio* chairman of the Executive Council, but shall vote therein only in case of a tie.

SECRETARY.

II. The Secretary shall attend and keep a record of all meetings of the Association and of the Executive Council, of which latter he shall be *ex-officio* clerk, and shall be entitled to vote therein.

He shall collect all moneys due from the members, and shall pay the same over to the Treasurer, taking his receipt therefor.

He shall supervise and conduct all correspondence of the Association; he shall superintend the publication of the TRANSACTIONS under the direction of the Executive Council, and shall perform all the ordinary duties of his office.

He shall be the custodian of the seal, books, and records of the Association.

TREASURER.

III. The Treasurer shall receive all moneys from the Secretary, pay all bills, and render an account thereof at the annual meetings, when an Auditing Committee shall be appointed to examine his accounts and vouchers.

EXECUTIVE COUNCIL.

IV. The Executive Council shall meet as often as the interests of the Association may require. The President, or any three members may call a meeting, and a majority shall constitute a quorum.

It shall have the management of the affairs of the Association, subject to the action of the house at its annual meetings.

It shall have control of the publications of the Association, with full power to accept or reject papers or discussions.

It shall have control of the arrangements for the annual meetings, and shall determine the order of the reading of papers.

It shall constitute a court of inquiry for the investigation of all charges against members for offences involving law or honor; and it shall have the sole power of moving the expulsion of any Fellow.

ORDER OF BUSINESS.

V. The Order of Business at the annual meetings of the Association shall be as follows:

1. General meeting at 10 o'clock A. M.
   a. Reports of Committees on Scientific Questions.
   b. Reading of Papers and Discussion of the same.
2. One business Meeting shall be held at half-past nine o'clock A. M. on the first day of the session, and another on the evening of the second day (unless otherwise ordered by vote), at which only the Fellows of the Association shall be present. At these meetings the Secretary's record shall be read; the Treasurer's accounts submitted; the reports of Committees on other than scientific subjects offered; and all miscellaneous business transacted.

PAPERS.

VI. The titles of all papers to be read at any annual meeting shall be furnished to the Secretary *not later* than one month before the first day of the meeting.

No paper shall be read before the Association that has already been published, or that has been read before any other body.

Not more than thirty minutes shall be occupied in reading any paper before the Association.

Abstracts of all papers read should be furnished to the Secretary at the meeting.

All papers read before the Association shall become its sole property if accepted for publication; and the Executive Council may decline to publish any paper not handed to the Secretary *complete* before the final adjournment of the annual meeting.

QUORUM.

VII. The Fellows present shall constitute a quorum for all business, excepting the admission of new Fellows or acting upon amendments to the Constitution, when not less than fifteen Fellows must be present.

DECORUM.

VIII. No remarks reflecting upon the personal or professional character of any Fellow shall be in order at any meeting, except when introduced by the Executive Council.

FINANCE.

IX. Each Fellow, on admission, shall pay an initiation fee of twenty-five dollars, which shall include his dues for the first year.

Every Fellow shall pay, *in advance* (*i.e.*, at the beginning of each fiscal year) the sum of twenty dollars annually thereafter.

[A fiscal year includes the period of time between the first day of one annual meeting and the first day of the next.]

Any Fellow neglecting to pay his annual dues for two years may forfeit his membership, upon vote of the Executive Council.

The Secretary shall receive, annually, a draft from the President, drawn on the Treasurer, for a sum, to be fixed by the Executive Council, for the services he shall have rendered the Association during the year.

A contingent fund of one hundred dollars shall be placed annually at the disposal of the Secretary for current expenses, to be disbursed by him, and for which he shall present proper vouchers.

ATTENDANCE.

X. Any Fellow who shall neither attend nor present a paper for five consecutive years, unless he offer a satisfactory excuse, shall be dropped from fellowship, upon vote of the Executive Council.

RULES.

XI. *Robert's Rules of Order* shall be accepted as a parliamentary guide in the deliberations of the Association.

AMENDMENTS.

XII. These By-Laws may be amended by a two-thirds vote of the Fellows present at any meeting; *provided*, previous notice in writing shall have been given at the annual meeting next preceding the one at which the vote is to be taken.

OFFICERS FOR 1916–1917

PRESIDENT

JOHN WILLIAM KEEFE, PROVIDENCE

VICE-PRESIDENTS

CHARLES L. ILL, NEWARK
FRANCIS REDER, ST. LOUIS

SECRETARY

E. GUSTAV ZINKE, CINCINNATI

TREASURER

HERMAN E. HAYD, BUFFALO

EXECUTIVE COUNCIL

MILES F. PORTER, FORT WAYNE
CHARLES N. SMITH, TOLEDO
MAGNUS A. TATE, CINCINNATI
CHARLES L. BONIFIELD, CINCINNATI
HUGO O. PANTZER, INDIANAPOLIS
ORANGE G. PFAFF, INDIANAPOLIS

LIST OF OFFICERS.

From the Organization to the Present.

	President.	*Vice-Presidents.*	*Secretary.*	*Treasurer.*
1888.	Taylor, Wm. H.	Montgomery, E. E. Carstens, J. H.	Potter, Wm. W.	Werder, X. O.
1889.	Montgomery, E. E.	Myers, W. H. Banta, R. L.	Potter, Wm. W.	Werder, X. O.
1890.	Wright, A. H.	Rohé, G. H. Hall, R. B.	Potter, Wm. W.	Werder, X. O.
1891.	Vander Veer, A.	Hill, H. E. Morris, R. T.	Potter, Wm. W.	Werder, X. O.
1892.	McMurtry, L. S.	Ill, Ed. J. Longyear, H. W.	Potter, Wm. W.	Werder, X. O.
1893.	Rohé, Geo. H.	Manton, W. P. Hulbert, Geo. F.	Potter, Wm. W.	Werder, X. O.
1894.	Carstens, J. H.	Davis, W. E. B. Howitt, H.	Potter, Wm. W.	Werder, X. O.
1895.	Price, Joseph	Cordier, Al. H. Peck, G. S.	Potter, Wm. W.	Werder, X. O.
1896.	Ross, J. F. W.	Johnston, G. B. Sexton, J. C.	Potter, Wm. W.	Werder, X. O.
1897.	Reed, C. A. L.	Douglas, R. Dorsett, W. B.	Potter, Wm. W.	Werder, X. O.
1898.	Ill, Edward J.	Ricketts, Ed. Miller, A. B.	Potter, Wm. W.	Werder, X. O.
1899.	Hall, R. B.	Dunning, L. H. Crofford, T. J.	Potter, Wm. W.	Werder, X. O.
1900.	Davis, W. E. B.	Walker, Ed. Goldspohn, A.	Potter, Wm. W.	Werder, X. O.
1901.	Ricketts, E.	Cumston, C. G. Porter, M. F.	Potter, Wm. W.	Werder, X. O.
1902.	Dunning, L. H.	Rosenwasser, M. Hayd, H. E.	Potter, Wm. W.	Werder, X. O.
1903.	Dorsett, W. B.	Miller, A. B. Haggard, W. D.	Potter, Wm. W.	Werder, X. O.
1904.	Longyear H. W.	Gilliam, D. T. Brown, J. Y.	Potter, Wm. W.	Werder, X. O.
1905.	Brown, J. Y.	West, J. N. Simpson, F. P.	Potter, Wm. W.	Werder, X. O.
1906.	Morris, R. T.	Crile, G. W. Bonifield, C. L.	Potter, Wm. W.	Werder, X. O.
1907.	Zinke, E. G.	Keefe, J. W. Sellman, W. A. B.	Potter, Wm. W.	Werder, X. O.
1908.	Humiston, Wm. H.	Sadlier, J. E. Davis, J. D. S.	Potter, Wm. W.	Werder, X. O.
1909.	Miller, A. B.	Smith, C. N. Huggins, R. R.	Potter, Wm. W.	Werder, X. O.
1910.	Hayd, H. E.	Schwarz, H. Morris, L. C.	Potter, Wm. W.	Werder, X. O.
1911.	Werder, X. O.	Frank, L. Tate, M. A.	Zinke, E. G.	Hayd, H. E.
1912.	Porter, M. F.	Smith, C. N. Sadlier, J. E.	Zinke, E. G.	Hayd, H. E.
1913.	Smith, C. N.	Pantzer, H. O. Branham, J. H.	Zinke, E. G.	Hayd, H. E.
1914.	Bonifield, C. L.	Davis, A. B. Sanes, K. I.	Zinke, E. G.	Hayd, H. E.
1915.	Pantzer, H. O.	Dickinson, G. K. Pfaff, O. G.	Zinke, E, G	Hayd, H. E.
1916.	Keete, J. W.	Ill, Chas. L. Pfaff, Orange G.	Zinke, E. G.	Hayd, H. E.

HONORARY FELLOWS.

1899.—BALLANTYNE, JOHN WILLIAM, M.D., F.R.C.P.E., F.R.S. Edin. Lecturer on Midwifery and Gynecology, School of Medicine of the Royal Colleges, Surgeons' Hall, Edinburgh; Physician to the Royal Maternity Hospital, Edinburgh; formerly President of the Edinburgh Obstetrical Society; Examiner in Midwifery in the University of Edinburgh; Honorary Fellow of the Glasgow Obstetrical and Gynecological Society. 19 Rothesay Terrace, Edinburgh, Scotland.

1889.—BANTOCK, GEORGE GRANVILLE, M.D., F.R.C.S. Ed. Surgeon to the Samaritan Free Hospital. Broad Meadow, King's Norton, Birmingham, England.

1889.—BARBOUR, SIR A. H. FREELAND, M.A., B.S.C., M.D. F.R.C.P. Ed., F.R.S. Ed. Lecturer on Midwifery and Diseases of Women in the Edinburgh Medical School; Assistant Physician to the Royal Maternity Hospital; Assistant Physician for Diseases of Women to the Royal Infirmary; Physician to the Women's Dispensary; Fellow of the Edinburgh and London Obstetrical Societies, and of the British Gynecological Society; Corresponding Fellow of the Royal Academy of Medicine, Turin. 4 Charlotte Square, Edinburgh, Scotland.

1889.—CROOM, SIR J. HALLIDAY, M.D., F.R.C.P.E., F.R.C.S.E., F.R.S.E. Professor of Midwifery in the University of Edinburgh; Consulting Physician to the Royal Infirmary; Physician to the Royal Maternity Hospital; late President of the Royal College of Surgeons, Edinburgh. 25 Charlotte Square, Edinburgh, Scotland.

1891.—FERNANDEZ, JUAN SANTOS, M.D. Prado, No. 105, Havana, Cuba.

1889.—FREUND, WILLIAM ALEXANDER, M.D. Emeritus Professor and Director of the Clinic for Diseases of Women in the University of Strassburg. Kleiststrasse 9, Berlin W., Germany.

1912.—GILLIAM, DAVID TOD, M.D. Emeritus Professor of Gynecology, Starling-Ohio Medical College; Gynecologist to St. Anthony Hospital; Member of the American Medical Association, Ohio State Medical Association, Columbus Academy of Medicine; Honorary Member of the Northwestern Ohio Medical Association; Ex-president, Franklin County Medical Society; *Vice-president*, 1905. 333 East State Street, Columbus, Ohio.

1894.—JACOBS, CHARLES, M.D. Professor of the Faculty of Medicine of Brussels; Secretary-General of the Permanent Committee of the Periodic International Congress of Gynecology and Obstetrics; Honorary President of the Belgian Society of Gynecology and Obstetrics; Honorary Fellow of the Gynecological Societies of New York and Chicago; Member of the Southern Surgical and Gynecological Association; Corresponding Member of the Gynecological Society of Paris; Surgeon to the Brussels Polyclinic. 53 Boulevard de Waterloo, Brussels, Belgium.

1905.—MCGRAW, THEODORE A., M.D. 73 Cass Street, Detroit, Mich.

1890.—MARTIN, AUGUST, M.D. Emeritus Professor of Gynecology in the University of Greifswald. Keithstrasse 14, Berlin W. 62, Germany.

1897.—MATHEWS, JOSEPH MCDOWELL, M.D. Professor of Diseases of the Rectum and Clinical Surgery, Hospital College of Medicine; President of the Kentucky State Board of Health; President American Medical Association, 1899; Alvarado Hotel, Los Angeles, Cal.

1910.—DE OTT, DIMITRIJ OSKAROVIC. Professor of Obstetrics and Gynecology in the Royal Pavloona Clinical Institute of St. Petersburg; President of the Fifth International Congress of Obstetrics and Gynecology. Wassily Ostrow, University Place, Petrograd, Russia.

1891.—PIETRANERA, E., M.D. Professor of Obstetrics in the Medical Department of the National University; Director of the Maternity Branch of the Clinical Hospital. 2711 Calle Rio Adaria, Buenos Ayres, Argentine Republic, S. A.

1889.—SCHULTZE, BERNHARD SIGMUND, M.D. Professor of Gynecology; Director of the Lying-In Institute and of the Gynecological Clinic. 2 Sellierstrasse, Jena, Germany.

1896.—STERNBERG, GEORGE MILLER, A.M., M.D., LL.D. Surgeon General U. S. Army (Retired). 2005 Massachusetts Avenue, Washington, D. C.

1888.—WILLIAMS, SIR JOHN, BART., M.D., F.R.C.P. Blaen Llynant, Aberystwyth, Cardiganshire, Wales.

Total, sixteen Honorary Fellows.

HONORARY FELLOWS, DECEASED.

1892.—Boisliniere, L. Ch., A.B., M.D., L.L.D., Saint Louis, Mo., 1896.

1890.—Championniere, Just. Lucas, M.D., Paris, France, 1913.

1889.—Charpentier, Louis Arthur Alphonse, M.D., Paris, France, 1899.

1888.—Cordes, Auguste E., M.D., Geneva, Switzerland, 1914.

1890.—Corson, Hiram, M.D., Plymouth Meeting, Pa., 1896.

1889.—Dunlap, Alexander, A.M., M.D., Springfield, O., 1894.

1888.—Edis, Arthur Wellesley, M.D., Lond. F.R.C.S., M.R.S.C.S., London, England, 1893.

1889.—Eklund, Abraham Fredrik, M.D., Stockholm, Sweden, 1898.

1891.—Fisher, George Jackson, A.M., M.D., Sing Sing, N. Y., 1893.

1896.—Gaston, James McFadden, A.M., M.D., Atlanta, Ga. 1903.

1892.—Green, Traill, M.D., LL.D., Easton, Pa., 1897.

1889.—Keith, Thomas, M.D., London, England, 1896.

1889.—Leopold, G., M.D., Dresden, Germany, 1913.

1894.—Maclein, Donald, M.D., Detroit, Mich., 1903.

1895.—Mastin, Claudius Henry, M.D., LL.D., Mobile, Ala., 1898.

1891.—Moses, Gratz Ashe, M.D., Saint Louis, Mo., 1901.

1905.—MYERS, WILLIAM HERSCHEL, M.D., Fort Wayne, Ind., 1907.

1889.—NICOLAYSEN, JULIUS, M.D., Christiania, Norway, 1915.

1889.—SAENGER, MAX, M.D., Prague, 1903.

1890.—SAVAGE, THOMAS, M.D., F.R.C.S. Eng., Birmingham, England, 1907.

1890—SEGOND, PAUL, M.D., Paris, France, 1913.

1899.—SINCLAIR, SIR WILLIAM JAPP, A.M., M.D., Manchester, England, 1913.

1894.—SLAVIANSKY, KRONID, M.D., St. Petersburg, Russia, 1898.

1888.—SMITH, J. GREIG, M.A., C.M., M.B., F.R.S.E., Bristol, England, 1897.

1899.—STORRS, MELANCTHON, A.M., M.D., Hartford, Conn., 1900.

1888.—TAIT, LAWSON, M.D., LL.D., F.R.C.S.E., Birmingham, England, 1899.

1905.—TAYLOR, WILLIAM HENRY, M.D., *President*, 1888–1889, Cincinnati, Ohio, 1910.

1900.—THORNTON, J. KNOWSLEY, M.B., M.C., Cambridge, England, 1904.

1901.—WEBER, GUSTAV C. E., M.D., LL.D., Willoughby, Ohio, 1912.

1889.—VON WINCKEL, F.M.D., Munich, Germany, 1912.

1905.—WYMAN, WALTER, M.D., Washington, D.C., 1911.

CORRESPONDING FELLOWS.

1899.—BEUTTNER, OSCAR, M.D. Professor of the Faculty of Medicine. 2 Place de la Fasterie, Geneva, Switzerland.

1903.—CROZEL, G., M.D. Professor Libre of Gynecology. Collonges au Mont d'Or (Rhone), France.

1914.—DAS, KEDARNATH, M.D. Professor of Midwifery and Gynecology, Campbell Medical School; Obstetrician and Gynecologist, Campbell Hospital, Calcutta; Examiner in Midwifery and Gynecology, Calcutta University; Examiner in Midwifery, College of Physicians and Surgeons, Bengal; Fellow, Royal Society of Medicine, London. 22, Bethune Row, Calcutta.

1903.—ELLIS, GUILHERME, M.D. Chief Surgeon to the Real Sociedade de Beneficencia Portuguese Hospital. 6 Rua Aurora, S. Paulo, Brazil, S. A.

1891.—GRIFFIN, HERBERT SPOHN, B.A., M B., M.D., C.M. Surgeon to St. Joseph's Hospital; Gynecologist to Hamilton City Hospital; 157 Main Street, Hamilton, Ontario, Canada.

1914.—HERTOGHE, EUGENE, M.D. Antwerp, Belgium.

1903.—LANE, HORACE MANLEY, M.D., LL.D. President of Mackenzie College, S. Paulo, Brazil. 184 Rua da Consolacao, S. Paulo, Brazil, S. A.

1891.—MACHELL, HENRY THOMAS, M.D., L.R.C.P. Ed. Lecturer on Obstetrics, Women's Medical College; Surgeon to St. John's Hospital for Women; Physician to Victoria Hospital for Sick Children and to Hillcrest Convalescent Home. 95 Bellevue Avenue, Toronto, Ontario, Canada.

1898.—WRIGHT, ADAM HENRY, B.A., M.D. Univ. Toronto, M.R.C.S., Eng. Professor of Obstetrics in the University of Toronto; Obstetrician and Gynecologist to the Toronto General Hospital and Burnside Lying-in Hospital, *President*, 1891. 30 Gerrard Street, East, Toronto, Ont., Canada.

Total, nine Corresponding Fellows.

SENIOR FELLOWS.

1913.—BLUME, FREDERICK, M.D. Gynecologist to the Allegheny General Hospital and Pittsburgh Free Dispensary; Obstetrician to the Roselia Maternity Hospital; Consulting Gynecologist to the Mercy Hospital; President of the Pittsburgh Obstetrical Society, 1892. Office, Jenkins Building, Pittsburgh, Pa.

1911.—LINCOLN, WALTER RODMAN, B.A., M.D. Lecturer on Gynecology, College of Physicians and Surgeons of Cleveland. Lennox Building, corner Erie Street and Euclid Avenue, Cleveland, Ohio.

1915.—LYONS, JOHN ALEXANDER, M.D., F.A.C.S. Instructor in Gynecology at the Post-Graduate Medical School; Gynecologist and Lecturer to Nurses at the Chicago Hospital. Residence, 6348 Anthony Avenue; Office, 4118 State Street, Chicago, Ill.

1913.—STAMM, MARTIN, M.D. Professor of Operative and Clinical Surgery in the College of Physicians and Surgeons, Cleveland. 316 Napoleon Street, Fremont, Ohio.

ORDINARY FELLOWS.

1902.—ABRAMS, EDWARD THOMAS, A.M., M.D., F.A.C.S. Consulting Surgeon to the Lake Superior General Hospital; Member of the Michigan State Medical Society; Member of the American Medical Association. Surgeon to St. Joseph's Hospital. Dollar Bay, Mich.

1895.—BACON, JOSEPH BARNES, M.D., F.A.C.S. Professor of Rectal Diseases at the Post-Graduate Medical School; Instructor in Clinical Surgery in the Medical Department of Northwestern University, Chicago. Macomb, Ill.

1911.—BAINBRIDGE, WILLIAM SEAMAN, M.D., A.M., M.S., C.M., Sc.D. Adjunct Professor, New York Post-Graduate Medical School, 1902–6; Professor New York Polyclinic Medical School and Hospital since 1906; Surgeon, New York Skin and Cancer Hospital; Attending Surgeon, New York City Children's Hospitals and Schools; Consulting Surgeon, Manhattan State Hospital, New York Home for Dependent Crippled Children, College of Dental and Oral Surgery of New York and Tarrytown Hospital, Tarrytown, N. Y.; Consulting Gynecologist, St. Andrew's Hospital (New York) and St. Mary's Hospital, Jamaica, Long Island and the Ossining Hospital, Ossining, N. Y.; Assistant Surgeon, Medical Reserve Corps, United States Navy; Honorary President International Congress for Study of Tumors and Cancers, Heidelberg, Germany, 1906. 34 Gramercy Place, New York City.

1895.—BALDWIN, JAMES FAIRCHILD, A.M., M.D., F.A.C.S. Surgeon to Grant Hospital, 125 South Grant Avenue. Residence, 405 E. Town Street, Columbus, Ohio.

1903.—BANDLER, SAMUEL WYLLIS, M.D., F.A.C.S. Instructor in Gynecology in the New York Post-Graduate Medical School and Hospital; Adjunct Gynecologist to the Beth Israel Hospital. 134 West Eighty-seventh Street, New York, N. Y.

1911.—BARETT, CHANNING W., M.D., F.A.C.S. Professor of Gynecology and Head of Division of Gynecology, University of

Illinois Medical School, Gynecologists and Head of Department of Gynecology, Cook County Hospital. 561 Stratford Pl. Chicago, Ill.

1913.—BAUGHMAN, GREER, M.D. Professor of Obstetrics, Medical College of Virginia; Visiting Obstetrician to the Stuart Circle Hospital and to the Memorial Hospital, Richmond, Virginia; Member of the Southern Surgical and Gynecological Association; Vice-President of the Medical Society of Virginia, 1905; Member of the Tri-State Medical Association of Virginia and the Carolinas; Richmond Academy of Medicine and Surgery and the American Medical Society. Residence and Office, 26 North Laurel St., Richmond, Virginia.

1907.—BELL, JOHN NORVAL, M.D., F.A.C.S. Associate Professor of Obstetrics, Detroit College of Medicine and Surgery; Attending Obstetrician, Harper Hospital; Consultant in Obstetrics, Woman's Hospital. Residence, 203 Pallister Avenue; Office, 1149 David Whitney Bldg., Detroit, Mich.

1914.—BILL, ARTHUR HOLBROOK, A.M., M.D. Associate Professor of Obstetrics, School of Medicine, Western Reserve University; Visiting Obstetrician to the Maternity Hospital of Cleveland; Visiting Obstetrician and Head of the Department, Cleveland City Hospital; Obstetrician in charge of Out-patient Obstetrical Department Western Reserve University. Residence, 2083 East 96th St.; Office, 1021 Prospect Ave., Cleveland, O.

1900.—BONIFIELD, CHARLES LYBRAND, M.D. Professor of Gynecology, Medical Department of the University of Cincinnati. Member and Ex-President, Cincinnati Academy of Medicine, Cincinnati Obstetrical Society, Ohio State Medical Association and Ohio Clinical Association. Member of American Medical Association, Southern Surgical and Gynecological Society. *President*, 1914. Residence, 1763 East McMillan Street, Office, 409 Broadway, Cincinnati, Ohio.

1896.—BOSHER, LEWIS C., M.D., F.A.C.S. Professor of Practice of Surgery and Clinical Surgery, Medical College of Virginia; Visiting Surgeon, Memorial Hospital, Richmond. 422 East Franklin Street, Richmond, Va.

Founder.—BOYD, JAMES PETER, A.M., M.D. Emeritus Professor of Obstetrics and Diseases of Children in the Albany Medical College; Consulting Obstetrician and Gynecologist to the Albany Hos-

pital; Fellow of the British Gynecological Society; Fellow of the Royal Society of Medicine. 152 Washington Avenue, Albany, N. Y.

1889.—BRANHAM, JOSEPH H., M.D. Professor of Surgery in the Maryland Medical College; Surgeon to the Franklin Square Hospital. 2200 Eutaw Place, corner Ninth Avenue, Baltimore, Md.

1912.—BROWN, GEORGE VAN AMBER, M.D. Gynecologist, Cystoscopist, German Polyclinic; Gynecologist, Providence Hospital. Residence, 55 Gladstone Ave.; Office, 919–922 J. Henry Smith Bldg., Cor. Griswold and State Sts., Detroit, Michigan.

1894.—BROWN, JOHN YOUNG, M.D., F.A.C.S. Professor of Clinical Surgery in Saint Louis University; Chief Surgeon to St. John's Hospital; President of the Mississippi Valley Medical Association, 1898; *Vice-president*, 1905; *President*, 1906; *Executive Council*, 1907–8. Residence, 303 North Grand Avenue; Office, 612 Metropolitan Building, Saint Louis, Mo.

1914.—BROWN, WILLIAM MORTIMER, M.D. Obstetrician to Rochester General Hospital. Residence, 1776 East Ave.; Office, 272 Alexander St., Rochester, N. Y.

1908.—BUTEAU, SAMUEL H., M.D., F.A.C.S. Former member of California State Board of Medical Examiners; formerly Visiting Surgeon to Almeda County Hospital. Residence, 1052 Telegraph Avenue; Office, 1155 Broadway, Oakland, Cal.

Founder.—CARSTENS, J. HENRY, M.D., F.A.C.S. Professor Abdominal and Pelvic Surgery, Detroit College of Medicine and Surgery, President of the Faculty. Consulting Gynecologist to the Harper Hospital; Cons. Obstetrician to the Woman's Hospital; Consulting Obstetrician to the House of Providence; Ex-President Michigan State Medical Society; Ex-President Mississippi Valley Medical Society; Ex-Chairman Section of Obstetrics, A. M. A.; Member Royal Society of Medicine; Member American College of Surgeons; etc., etc. President of the Detroit Gynecological Society, 1892. *Vice-president*, 1888–89; *President*, 1895; *Executive Council*, 1896–98. 1447 David Whitney Building, Detroit, Mich.

1914.—CHANDLER, GEORGE, M.D., F.A.C.S. Surgeon to the Kingston City Hospital. Residence and Office, 11 East Chestnut St., Kingston, N. Y.

1915.—CLARK, EDMUND DOUGAN, M.D., F.A.C.S. Professor of Surgery and Secretary of the Faculty, Indiana University School of

Medicine. Residence, 1236 New Jersey Street; Office, Hume-Mansur Building, Indianapolis, Ind.

1904.—CONGDON, CHARLES ELLSWORTH, M.D. Gynecologist to the City Hospital for Women. Office, 859 Humboldt Parkway, Buffalo, N. Y.

1901.—CRILE, GEORGE W., A.M., M.D., F.A.C.S., Professor of Surgery, Western Reserve Medical College; Visiting Surgeon to Lakeside Hospital. *Vive-president*, 1907. Residence, 2620 Derbyshire Road, Cleveland Heights. Office, Osborn Bldg., Cleveland, Ohio.

1912.—CROTTI, ANDRE, M.D., F.A.C.S. Professor of Clinical Surgery, Ohio State University; Surgeon to Grant Hospital, Children's Hospital and to St. Francis Hospital. Residence, 1728 E. Broad Street; Office, 151 E. Broad Street, Columbus, Ohio.

1905.—CROSSEN, HARRY STURGEON, M.D., F.A.C.S. Clinical Professor of Gynecology in Washington University; Gynecologist to Washington University Hospital; Associate Gynecologist to Mullanphy Hospital; Consulting Gynecologist to Bethesda, City and Female Hospitals. Residence, 4477 Delmar Avenue; Office, 310 Metropolitan Building, Saint Louis, Mo.

1912.—DARNALL, WILLIAM EDGAR, A.B., M.D., F.A.C.S. Gynecologist, Atlantic City Hospital; Consulting Surgeon to North American Children's Sanitarium for the Treatment of Surgical Tuberculosis, and Home for Incurables, Longport, New Jersey. *Vice-president* American Medical Association, 1914. Residence and Office, 1704 Pacific Ave., Atlantic City, N. J.

1911.—DAVIS, ASA BARNES, M.D., F.A.C.S. Attending Surgeon of the Society of the Lying-in Hospital of the City of New York; Consulting Gynecologist to the Vassar Brothers' Hospital, Poughkeepsie, N. Y. 42 E. 35th Street, New York.

1915.—DAVIS, JAMES ETHELBERT, M.D. Attending Surgeon, Providence Hospital, Detroit; Chief of Staff, Salvation Army Maternity Hospital, Detroit; Associate Professor of Surgery, Detroit College of Medicine and Surgery. Residence, 831 West Fort Street; Office, 1229 David Whitney Building, Detroit, Mich.

1903.—DAVIS, JOHN D. S., M.D., LL.D., F.A.C.S. Professor of Surgery in the Post-Graduate School of Medicine of the University of Alabama; Surgeon to Hillman Hospital; Surgeon to Davis Infirm-

ary; ex-President Jefferson County Medical Society; *Vice-president*, 1905; *Vice-president*, 1909. 2031 Avenue G, Birmingham, Ala.

1910.—DICE, WILLIAM GORDON, A.B., M.D. Obstetrician to Flower Hospital. 240 Michigan Street, Toledo, Ohio.

1909.—DICKINSON, GORDON K., M.D., F.A.C.S. Surgeon to the City and Christ Hospitals; Consulting Surgeon to Bayonne Hospital. Consulting Surgeon, Stumpf Memorial Hospital, Kearny, N. J. 280 Montgomery Street, Jersey City, N. J.

1899.—EASTMAN, THOMAS BARKER, A.B., M.D., F.A.C.S. Professor of the Medical and Surgical Diseases of Women, Central College of Physicians and Surgeons; Gynecologist to the City Hospital, City Dispensary, and Central Free Dispensary. 309 Pennway Building, Indianapolis, Ind.

1904.—ELBRECHT, OSCAR H., PH.B., M.D., F.A.C.S. Formerly Superintendent and Surgeon in Charge, St. Louis Female Hospital; Visiting Surgeon, St. Louis City Hospital; Consulting Gynecologist, Missouri Pacific Hospital; Consulting Surgeon to St. Louis Maternity Hospital and former Chief of Staff; Consulting Surgeon, Bethesda Hospital; Member of Southern Surgical and Gynecological Association. Residence, Buckingham Hotel; Office, 423 Metropolitan Building, St. Louis, Mo.

1906.—ERDMANN, JOHN FREDERICK, M.D., F.A.C.S. Professor of Surgery, N. Y. Post-Graduate Hospital and Medical School; Attending Surgeon to Gouverneur Hospital and Post-Graduate Hospital; Consulting Surgeon to St. John's Riverside Hospital, Yonkers, N. Y.; Mt. Vernon General Hospital, Mt. Vernon, N. Y.; Greenwich General Hospital, Greenwich, Conn.; Nassau Hospital, Mineola, L. I. 60 West Fifty-second Street, New York, N. Y.

1911.—FINDLEY, PALMER, B.E., M.D., F.A.C.S. Professor of Gynecology, College of Medicine, University of Nebraska. 418 Brandeis Theater Building, Omaha, Neb.

1910.—FOSTER, CURTIS SMILEY, A.B., M.D., F.A.C.S. Gynecologist to the Western Pennsylvania Hospital, Pittsburgh. Residence, 5749 Ellsworth Avenue; Office, 308 Diamond Bank Building, Pittsburgh, Pa.

1903.—FRANK, LOUIS, M.D., F.A.C.S. Professor of Abdominal and Pelvic Surgery, Medical Department, University of Louisville; Surgeon Louisville City Hospital; Surgeon to John N. Norton Memorial Infirmary; President Mississippi Valley Medical Association, 1912; *Executive Council*, 1913. Residence, 1321 Fourth Ave.; Office, 400 The Atherton, Louisville, Kentucky.

1913.—FREELAND, JAMES ROY, M.D., F.A.C.S. Obstetrician to Western Pennsylvania Hospital, Pittsburgh, Pa. Residence and Office, 4715 Fifth Ave., Pittsburgh, Pa.

1912.—FURNISS, HENRY DAWSON, M.D., F.A.C.S. Adjunct Professor of Gynecology, New York Post-Graduate Hospital; Assistant Attending Gynecologist New York Post-Graduate Hospital; Assistant Attending Gynecologist New York Red Cross Hospital; Consulting Cystoscopist, New Rochelle Hospital; Fellow New York Academy of Medicine, New York Medico-Surgical Society, New York Obstetrical Society, New York State and County Medical Societies, American Medical Association, American Urological Society. Residence, 393 West End Ave.; Office, 375 West End Avenue, New York, N. Y.

1902.—GILLETTE, WILLIAM J., M.D. Professor of Abdominal Surgery and Gynecology in the Toledo Medical College; Surgeon to Robinwood Hospital. 1613 Jefferson Street, Toledo, Ohio.

1895.—GOLDSPOHN, ALBERT, M.S., M.D., F.A.C.S. Professor of Gynecology, Post-Graduate Medical School; Surgeon in Chief of Evangelical Deaconess Hospital. *Vice-president*, 1901. Residence, 2118, Office, 2120 Cleveland Avenue, Chicago, Ill.

1912.—GOODMAN, SYLVESTER JACOB, PH.G., M.D., F.A.C.S. Surgeon and Obstetrician Grant Hospital; Lecturer of Obstetrics; Training School for Nurses, Grant Hospital; Consulting Surgeon, Actor's Fund of America, etc., etc. Residence and Office, 238 State Street, Columbus, Ohio.

1913.—HADDEN, DAVID, B.S., M.D., F.A.C.S. Residence, 2716 Telegraph Ave., Berkeley; Office, Oakland Bank of Savings Bldg., Oakland, Cal.

1900.—HAGGARD, WILLIAM DAVID, JR., M.D., F.A.C.S. Professor of Gynecology, Medical Department University of Tennessee; Professor of Gynecology and Abdominal Surgery, University of the South (Sewanee); Gynecologist to the Nashville City Hospital;

President of the Nashville Academy of Medicine; Secretary of the Section on Diseases of Women and Obstetrics, American Medical Association, 1898; Fellow (and Secretary) of the Southern Surgical and Gynecological Association; Member of the Alumni Association of the Woman's Hospital, N. Y. *Vice-president*, 1904. 148 Eighth Avenue, North, Nashville, Tenn.

1906.—HALL, JOSEPH ARDA, M.D., F.A.C.S. Clinical Assistant in Gynecology at the Miami Medical College, Cincinnati. 628 Elm Street, Cincinnati, Ohio.

1889.—HALL, RUFUS BARTLETT, A.M., M.D., F.A.C.S. Professor of Clinical Gynecology in the Ohio-Miami Medical College, Medical Department of University of Cincinnati; Gynecologist to the Cincinnati Hospital; Surgeon in charge of the Hall Hospital; Member of the British Medical Society; of the Southern Surgical and Gynecological Association; of the American Medical Association; of the Ohio State Medical Society (President, 1900); of the Cincinnati Academy of Medicine (President, 1909); of the Cincinnati Obstetrical Society (Ex-President). *Vice-president*, 1891; *President*, 1900; *Executive Council*, 1904–1909. Berkshire Building, 628 Elm Street, Cincinnati, Ohio.

1902.—HAMILTON, CHARLES SUMNER, A.B., M.D., F.A.C.S. Professor of the Principles of Surgery in Starling Medical College; Surgeon to Mt. Carmel and the Children's Hospitals. 142 South Garfield Street, Columbus, Ohio.

1910.—HARRAR, JAMES AITKEN, M.D., F.A.C.S. Attending Surgeon to the Lying-in Hospital of the City of New York. Residence and Office, 108 East 64th Street, New York, N. Y.

1894.—HAYD, HERMAN EMIL, M.D., M.R.C.S. Eng., F.A.C.S. Surgeon to the German Deaconess Hospital; Surgeon to the German Hospital. *Vice-president*, 1903; *Executive Council*, 1908–1910; *President*, 1911. 493 Delaware Avenue, Buffalo, N. Y.

1908.—HEDGES, ELLIS W., A.B., M.D., F.A.C.S. Visiting Surgeon to Muhlenberg Hospital, Plainfield, N. J. 703 Watchung Avenue, Plainfield, N. J.

1910.—HILL, ISADORE LEON, A.B., M.D. Clinical Instructor of Obstetrics at Cornell University Medical College; Visiting Obstetrician to the Red Cross Hospital; Attending Obstetrician to Sydenham Hospital. 616 Madison Avenue, New York, N. Y.

1891.—HOWITT, HENRY, M.D., M.R.C.S. Eng., F.A.C.S. Senior Surgeon to the Guelph General and St. Joseph's Hospitals, Guelph. Member of the British, Canadian and Ontario Medical Associations. President of the Guelph Medical Association. *Vice-president*, 1895. 221 Woolwich St., Guelph, Ontario, Canada.

1905.—HUGGINS, RALEIGH RUSSELL, M.D., F.A.C.S. Surgeon to St. Francis Hospital. *Vice-president*, 1910. 1018 Westinghouse Building, Pittsburgh, Pa.

1895.—HUMISTON, WILLIAM HENRY, M.D. Clinical Professor of Gynecology in the Medical Department of Western Reserve University; Gynecologist in Chief to St. Vincent's Charity Hospital; Consulting Gynecologist to the City Hospital; President of the Ohio State Medical Society, 1898. *Executive Council*, 1902–1903, 1908, 1910–1911. *President*, 1909. Residence, 2041 East Eighty-ninth Street; Office, 536 Rose Building, Cleveland, Ohio.

1901.—ILL, CHARLES L., M.D., F.A.C.S. Surgeon to the German Hospital; Assistant Gynecologist to St. Michael's and St. Barnabas's Hospitals; Obstetrician to St. Barnabas's Hospital, Newark; Assistant Gynecologist to All Souls' Hospital, Morristown. 188 Clinton Avenue, Newark, N. J.

Founder.—ILL, EDWARD JOSEPH, M.D., F.A.C.S. Surgeon to the Woman's Hospital; Medical Director of St. Michael's Hospital; Gynecologist and Supervising Obstetrician to St. Barnabas's Hospital; Consulting Gynecologist to the German Hospital and the Bnoth Israel Hospital of Newark, N. J., to All Souls' Hospital, Morristown, N. J., and to the Mountain Side Hospital, Montclair, N. J.; Member of the Southern Surgical and Gynecological Association; Vice-president from New Jersey of the Pan-American Medical Congress of 1893; President of the Medical Society of the State of New Jersey, 1907. *Vice-president*, 1893; *President*, 1899; *Executive Council*, 1901–1903. 1002 Broad Street, Newark, N. J.

1909.—JACOBSON, JULIUS H., M.D., F.A.C.S. Professor of Gynecology and Clinical Surgery, Medical Department Toledo University; Surgeon to Lucas City Hospital; Gynecologist to St. Vincent's Hospital, Toledo. 2050 Franklin Street, Toledo, O.

1906.—JONAS, ERNST, M.D., F.A.C.S. Clinical Professor of Surgery in Washington University Medical School; Surgeon in Charge of the Surgical Clinic at the Washington University Hospital;

Gynecologist to the St. Louis Jewish Hospital; Visiting Surgeon to St. Louis City Hospital; Consulting Surgeon to St. John's Hospital; Surgeon to the Martha Parsons Free Hospital for Children. Residence, 4495 Westminster Place; Office, 465 North Taylor Avenue, St. Louis, Mo.

1910.—JONES, ARTHUR THOMAS, M.D., F.A.C.S. Visiting Gynecologist to St. Joseph's Hospital, Providence; Visiting Surgeon to Memorial Hospital, Pawtucket, R. I.; Visiting Surgeon to Rhode Island State Hospital for the Insane, Howard, R. I.; Consulting Surgeon to Woonsocket Hospital, Woonsocket, R. I. 81 Elm Grove Avenue, Providence, R. I.

1902.—KEEFE, JOHN WILLIAM, M.D., L.L.D., F.A.C.S. Attending Surgeon to the Rhode Island Hospital and Providence City Hospital; Consulting Surgeon to the St. Joseph's Hospital, Providence Lying-In Hospital, Memorial Hospital, Pawtucket and Woonsocket Hospital. *Vice-president*, 1908. *Executive Council*, 1911. 262 Blackstone Boulevarde, Providence, R. I.

1910.—KENNEDY, JAMES W., M.D., F.A.C.S. Associate Gynecologist and Obstetrician to the Philadelphia Dispensary. 1409 Spruce Street, Philadelphia, Pa.

1911.—KING, JAMES E., M.D., F.A.C.S. Professor of Clinical Gynecology, Medical Department, University of Buffalo, New York; Attending Gynecologist, Buffalo General and Erie County Hospital and Good Samaritan Dispensary; Fellow Royal Society of Medicine, London, England. 1248 Main Street, Buffalo, N. Y.

1908.—KIRCHNER, WALTER C. G., A.B., M.D., F.A.C.S. Formerly Superintendent and Surgeon in charge of the St. Louis City Hospital. Visiting Surgeon City Hospital, Consulting Surgeon St. John's Hospital. Office, Metropolitan Building, St. Louis, Mo.

1898.—LANGFITT, WILLIAM STERLING, M.D., F.A.C.S. Surgeon in chief to St. John's Hospital. Office, 8047 Jenkins Building, Pittsburgh, Pa.

1914.—LEIGHTON, JR., ADAM P., L.M. (Dublin), M.D. Assistant in Gynecology, Bowdoin Medical School; Superintendent and Owner, Dr. Leighton's Maternity Hospital, Portland; Gynecologist to Edward Mason Dispensary, Portland; Member, State Board of Registration of Medicine. Residence and Office, 192 State Street, Portland, Me.

1915.—LITZENBERG, JENNINGS, A.B., M.D., F.A.C.S. Professor of Gynecology and Obstetrics, University of Minnesota. · Residence, 3137 Park Avenue; Office, Donaldson Building, Minneapolis, Minn.

1890.—LONGYEAR, HOWARD WILLIAMS, M.D., F.A.C.S. Professor of Gynecology and Abdominal Surgery in the Detroit Post-Graduate Medical School; Clinical Professor of Gynecology in the Detroit College of Medicine; Gynecologist to Harper Hospital; Physician to the Woman's Hospital; President of the Detroit Gynecological Society, 1889; Chairman of the Section on Obstetrics and Gynecology of the Michigan State Medical Society, 1892. *Vice-president*, 1893; *President*, 1905; *Executive Council*, 1906–1908. 271 Woodward Avenue, Detroit, Mich.

1911.—LOTHROP, EARL P., A.B., M.D., F.A.C.S. Gynecologist to the Buffalo Woman's Hospital; Consulting Surgeon to Columbus Hospital, Buffalo; Surgeon to the J. N. Adam Memorial Hospital for Tuberculosis, Perrysburg, N. Y. 153 Delaware Avenue, Buffalo, N. Y.

1910.—LOTT, HENRY STOKES, M.D. 123 Cherry Street, Winston, N. C.

1913.—LYNCH, JEROME MORLEY, M.D., F.A.C.S. Professor Rectal and Intestinal Diseases, New York Polyclinic; Consulting Surgeon Nassau Hospital, Mineola, L. I.; Attending Surgeon St. Mary's Hospital, Hoboken, N. J.; Member New York State and County Societies, American Medical Association, American Proctologic Society, North Western Medical and Surgical Society; Surgeon Medical Reserve, U. S. N. Residence and Office, 57 East Fifty-second St., New York City.

1910.—MCCLELLAN, BENJAMIN BUSH, A.B., A.M., M.D., F.A.C.S. Member American Medical Association; ex-President Ohio State Medical Society; Surgeon to McClellan Hospital. Residence, 636 South Detroit Street; Office, 7 East Second Street, Xenia, Ohio.

Founder.—MCMURTRY, LEWIS SAMUEL, A.M., M.D., LL.D., F.A.C.S. Professor of Gynecology in the Hospital College of Medicine; Gynecologist to Sts. Mary and Elizabeth Hospital; Fellow of the Edinburgh Obstetrical Society; Fellow of the British Gynecological Society; Corresponding Member of the Obstetrical Society of Philadelphia and of the Gynecological Society of Boston; Member

(President, 1891) of the Southern Surgical and Gynecological Association; President American Medical Association, 1905. *Executive Council*, 1891–1892, 1895–1905; *President*, 1893. Suite 542, The Atherton, Louisville, Ky.

1910.—McPHERSON, ROSS, A.B., M.D. Attending Surgeon to the Lying-in Hospital of the City of New York. Residence, 26 Gramercy Park, East; Office, 20 West Fiftieth Street, New York, N. Y.

Founder.—MANTON, WALTER PORTER, M.D., F.A.C.S. Head of Department and Professor of Obstetrics and Clinical Gynecology, Detroit College of Medicine and Surgery; Gynecologist to Harper Hospital and the Pontiac and Traverse City State Hospitals; Consulting Gynecologist to St. Joseph's Retreat; Formerly President of the Medical Board and Visiting Obstetrician Woman's Hospital and Infants' Home; President Detroit Academy of Medicine, 1892–1894; President Detroit Gynecological Society, 1890; President Wayne County Medical Society, 1908–1909; Chairman, Section on Obstetrics and Diseases of Women, 1909; Fellow of the Royal Medical Society, the American Gynecological Society, the American College of Surgeons; the Zoological Society of London, etc. *Vice-president*, 1894. 32 Adams Avenue, W., Detroit, Mich.

1911.—MARVEL, EMERY, M.D., F.A.C.S. Chief Surgeon and Gynecologist, Private Hospital Association, Atlantic City; Consulting Surgeon and Gynecologist, Jewish Seashore Home, Atlantic City, 1801 Pacific Avenue, Atlantic City, N. J.

1914.—MEEKER, HAROLD DENMAN, A.B., M.D. Adjunct Professor of Surgery, Polyclinic Medical School and Hospital, New York; Visiting Surgeon to New York Red Cross Hospital; Assistant Surgeon, U.S.N., M.R.C. Residence and Office, 220 West 79th Street, New York, N. Y.

Founder.—MILLER, AARON BENJAMIN, M.D., F.A.C.S. Professor of Gynecology in the Medical Department of Syracuse University; Gynecologist to St. Joseph's Hospital, House of the Good Shepherd and Dispensary. *Vice-president*, 1899, 1904; *President*, 1910; *Executive Council*, 1911. 326 Montgomery Street, Syracuse, N. Y.

1905.—MILLER, JOHN D., M.D., F.A.C.S. Assistant to the Chair of Clinical Gynecology in the Medical College of Ohio, University

of Cincinnati; Gynecologist to the Good Samaritan Hospital. N. E. Corner Clifton Avenue and W. McMillan Street, Cincinnati, Ohio.

1911.—MOOTS, CHARLES W., B.S., M.D., F.A.C.S. Gynecologist to Flower Hospital; President of Academy of Medicine of Toledo and Lucas County, 1912. Residence, River Road, R.F.D. No. 4; Office, 347 The Nicholas, Toledo, Ohio.

1907.—MORIARTA, DOUGLAS C., M.D., F.A.C.S. Senior Surgeon to Saratoga Hospital; Surgeon in chief to Saint Christian Hospital for Children; Director of State Experimental Station at Saratoga. 511 Broadway, Saratoga Springs, N. Y.

1904.—MORRIS, LEWIS COLEMAN, M.D., F.A.C.S. Professor of Gynecology and Abdominal Surgery in the Birmingham Medical College; Secretary, Medical Association State of Alabama, 1904; Member of Jefferson County Board of Health. *Vice-president*, 1911. 1203 Empire Building, Birmingham, Ala.

1890.—MORRIS, ROBERT TUTTLE, A.M., M.D., F.A.C.S. Professor of Surgery in the New York Post-Graduate Medical School and Hospital. *Vice-president*, 1892; *Executive Council*, 1906, 1908–1911; *President*, 1907. 616 Madison Avenue, New York, N. Y.

1896.—NOBLE, GEORGE HENRY, M.D. F.A.C.S. Gynecologist to the Grady Hospital; Secretary to the Section on Obstetrics and Gynecology of American Medical Association, 1897; Member of the Southern Surgical and Gynecological Association. 186 South Pryor Street, Atlanta, Ga.

1903.—NOBLE, THOMAS BENJAMIN, M.D. Professor of Abdominal Surgery in the Central College of Physicians and Surgeons; Consultant in the Diseases of Women at the City Hospital, City Dispensary, and Protestant Deaconess's Hospital, Indianapolis. 427 Newton Claypool Building, Indianapolis, Ind.

1907.—OLMSTED, INGERSOLL, M.D., F.A.C.S. Surgeon to the City and St. Joseph's Hospitals, Hamilton, Ont. 215 South James St., Hamilton, Ontario, Canada.

1899.—PANTZER, HUGO OTTO, A.M., M.D., F.A.C.S., Past Professor, Surgical Pathology and Clinical Gynecology, in the Central College of Physicians and Surgeons; Past Professor Clinical Gyne-

cology, Indiana Medical College, Medical Department of Purdue University; Late Professor of Clinical Gynecology in the Indiana Medical college, Medical Department of Indiana University; Gynecologist to Methodist Hospital; Past President of Indianapolis Medical Society; Member of Indiana State Association and American Medical Association. *President* 1915. 601 Hume-Mansur Bldg., Indiapolis, Ind.

1916.—PECK, GEORGE AUGUSTUS, M.D., Attending Surgeon, New Rochelle Hospital, New Rochelle, N. Y.; Consulting Surgeon, Westchester County Hospital, New York. Residence and Office 189 Centre Ave., New Rochelle, N. Y.

1916.—PERCY, JAMES FULTON, M.A., M.D., F.A.C.S. Residence 593 East Losey St., Office, 147 South Cherry St., Galesburg, Ill.

1899.—PFAFF, ORANGE G., M.D. Adjunct Professor of Obstetrics and Diseases of Women in the Medical College of Indiana; Gynecologist to the City, Deaconess's, and St. Vincent's Hospitals. 1337 North Pennsylvania Street, Indianapolis, Ind.

1898.—PORTER, MILES F., M.D., F.A.C.S. Surgeon to Hope Hospital; Professor of Surgery in the Indiana University School of Medicine; ex-President Indiana State Medical Society. *Vice-president*, 1902; *President*, 1912–1913. 207 West Wayne Street, Fort Wayne, Ind.

1914.—POTTER, IRVING WHITE, M.D. Attending Obstetrician, St. Mary's Maternity Hospital, Assistant Obstetrician, Buffalo General Hospital; Attending Obstetrician, German Deaconess Hospital. Residence and Office, 420 Franklin St., Buffalo, N. Y.

1903.—POUCHER, JOHN WILSON, M.D., F.A.C.S. Consulting Surgeon to Vassar Brothers Hospital, Poughkeepsie. 339 Mill Street, Poughkeepsie, N. Y.

1904.—REDER, FRANCIS, M.D., F.A.C.S. Surgeon to Missouri Baptist Sanitarium; Surgeon to St. John's Hospital; Visiting Surgeon to St. Louis City Hospital, and allied Institutions. Residence, 6346 Berlin Avenue; Office, 518–519 Delmar Building, St. Louis, Mo.

Founder.—REED, CHARLES ALFRED LEE, A.M., M.D., F.A.C.S. Professor of Gynecology and Abdominal Surgery in the Cincinnati College of Medicine and Surgery and in the Woman's Medical

College of Cincinnati; Surgeon to the Cincinnati Free Surgical Hospital for Women; Secretary-General of the First Pan-American Medical Congress, 1893; Member of the Southern Surgical and Gynecological Association; Fellow of the British Gynecological Society; President of the American Medical Association, 1901. *Executive Council*, 1890–1897; *President*, 1898. Rooms 60 and 62, The Groton, N. E. corner Seventh and Race Streets, Cincinnati, Ohio.

1913.—RONGY, ABRAHAM JACOB, M.D., F.A.C.S. Attending Gynecologist, Lebanon Hospital; Attending Surgeon, Jewish Maternity Hospital; Consulting Gynecologist, Rockaway Beach Hospital. Residence and Office, 154 Henry Street, New York City.

1909.—ROSENTHAL, MAURICE I., M.D., F.A.C.S. Surgeon to Saint Joseph's Hospital. 336 W. Berry Street, Fort Wayne, Ind.

1902.—RUNYAN, JOSEPH PHINEAS, M.D. Division Surgeon to the Choctaw, Oklahoma and Gulf Railroad; Secretary of the Arkansas State Medical Association, President, 1904. 1514 Schiller Avenue, Little Rock, Ark.

1906.—RUTH, CHARLES EDWARD, M.D., F.A.C.S. Professor of Surgery and Clinical Surgery in the Keokuk Medical College (College of Physicians and Surgeons); Surgeon to the Chicago and Rock Island Pacific Railway. Des Moines, Iowa.

1903.—SADLIER, JAMES EDGAR, M.D., F.A.C.S. Consulting Surgeon to Highland Hospital, Poughkeepsie. *Vice-president*, 1909. 295 Mill Street, Poughkeepsie, N. Y.

1909.—SANES, K. ISADORE, M.D., F.A.C.S. Gynecologist to the West Penn Hospital; Consulting Gynecologist to the Montefiore Hospital, Pittsburgh. Residence, 234 McKee Place; Office, Jenkins Building, Pittsburgh, Pa.

1910.—SCHILDECKER, CHARLES BUSHFIELD, M.D. Assistant Gynecologist to Western Pennsylvania Hospital; Coroner's Physician of Allegheny County. Residence, 414 Rebecca Street; Office, 1105 Park Building, Pittsburgh, Pa.

1904.—SCHWARZ, HENRY, M.D., F.A.C.S. Professor of Obstetrics, Medical Department of Washington University. *Vice-president*, 1911. 440 North Newstead Avenue, St. Louis, Mo.

1901.—SCOTT, N. STONE, A.M., M.D. Professor of Surgery, College of Physicians and Surgeons, Cleveland; Consulting Surgeon to City Hospital; Consulting Surgeon to St. John's Hospital; Surgeon to the Out-patient Department of Cleveland General Hospital. Residence, 531 Prospect Avenue; Office, 603–604 Citizens' Building, Cleveland, Ohio.

1895.—SELLMAN, WILLIAM ALFRED BELT, M.D. Gynecologist to The Biedler and Sellman Sanitarium; Member of the Medical and Chirurgical Faculty of Maryland; also of the Baltimore City Medical Society; also of the American Medical Association; the Gynecological and Obstetrical Association of Baltimore; Physician to The Margaret J. Bennett Home for Young Ladies. *Vice-president*, 1908; *Executive Council*, 1909–1910. 5 East Biddle Street, Baltimore, Maryland.

1908.—SHERRILL, JOSEPH GARLAND, A.M., M.D., F.A.C.S. Professor of Surgery and Clinical Surgery at the University of Louisville. Office, Suite 542, The Atherton, Louisville, Ky.

1899.—SIMPSON, FRANK FARROW, A.B., M.D., F.A.C.S. Gynecologist to the Allegheny General Hospital; Consulting Gynecologist to the Columbia Hospital. *Vice-president*, 1906. Jenkins Building, Pittsburgh, Pa.

1912.—SKEEL, ARTHUR JULIUS, M.D., F.A.C.S. Assistant Professor of Obstetrics, Western Reserve University; Obstetrician to St. Luke's Hospital; Consulting Obstetrician to the Florence Crittenden Home; Consulting Obstetrician to the Woman's Hospital. Residence and Office, 1834 East 65th Street, Cleveland, Ohio.

1901.—SKEEL, ROLAND EDWARD, M.D., F.A.C.S. Associate Clinical Professor of Gynecology in Western Reserve University; Gynecologist to St. Luke's, City, and Lutheran Hospitals; Consulting Surgeon to the Lakewood Hospital. 314 Osborn Building, Cleveland, Ohio.

1910.—SMEAD, LEWIS FREDERIC, A.B., M.D., F.A.C.S. Surgeon to St. Vincent's Hospital, Toledo. Residence, 2921 Parkwood Avenue; Office, 242 Michigan Street, Toledo, Ohio.

1891.—SMITH, CHARLES NORTH, M.D., F.A.C.S. Surgical Chief of Flower Hospital; Gynecologist to St. Vincent's Hospital; *Vice-president*, 1910. 234 Michigan Street, Toledo, Ohio.

1913.—SMITH, LEWIS WATSON, A.B., M.D. Assistant Gynecologist, Allegheny General Hospital; Gynecologist, Pittsburgh Free Dispensary. Residence and Office, 6024 Station St., Pittsburgh, Pa.

1904.—SMITH, WILLIAM S., M.D. Professor of Gynecology in the Maryland Medical College; Gynecologist to Franklin Square Hospital. 528 Hanover Street, Baltimore, Md.

1902.—STARK, SIGMAR, M.D., F.A.C.S. Professor of Obstetrics and Clinical Gynecology in the Cincinnati College of Medicine and Surgery; Gynecologist to the Jewish Hospital. 1108 East McMillan Street, Cincinnati, Ohio.

1908.—STEWART, DOUGLAS HUNT, M.D., F.A.C.S. Surgeon O. P. D. Knickerbocker Hospital. Residence, 128 West 6th Street, New York, N. Y.

1911.—STILLWAGEN, CHARLES A., M.D., F.A.C.S. Office, Highland Bldg., Residence, 5343 Pennsylvania Avenue, Pittsburgh, Pa.

1914.—STRASSER, AUGUST ADRIAN, M.D., F.A.C.S. Surgeon, Stumpf Memorial Hospital, Kearny, N. J.; Assistant Surgeon of the Woman's Hospital, St. Michaels Hospital, Newark, N. J.; Adjunct Surgeon, St. James Hospital, Newark, N. J. Residence and Office, 115 Beech St., Arlington, N. J.

1904.—SUTCLIFFE, JOHN ASBURY, A.M., M.D. Professor of Genitourinary Surgery; Indiana School of Medicine; Consulting Surgeon to St. Vincent's Infirmary; Consultant in Genitourinary Diseases to the City Hospital and to the Protestant Deaconess's Hospital. Residence, 1121 Central Avenue; Office, 155 East Market Street, Indianapolis, Ind.

1899.—SWOPE, LORENZO W., M.D., F.A.C.S. Surgeon to the Consolidated Traction Company; Chief Surgeon to Wabash Railroad, Pittsburgh Division; Surgeon to Western Pennsylvania Hospital; Surgeon to Passavant Hospital; Member of the Allegheny County Medical Society; Member of the American Medical Association. Residence, 4629 Bayard Street; Office, 1105 Park Building, Pittsburgh, Pa.

1901.—TATE, MAGNUS ALFRED, M.D., F.A.C.S. Professor of Obstetrics Miami Medical College; President Cincinnati Academy of Medicine, 1905. 19 West Seventh Street, Cincinnati, Ohio.

1908.—TORRANCE, GASTON, M.D. Surgeon to St. Vincent's and the Hillman Hospitals in Birmingham. Residence, 1626 Eleventh Avenue, South; Office, 325 Woodward Building, Birmingham, Ala.

Founder.—VANDER VEER, ALBERT, A.M., M.D., PH.D., LL.D., F.A.C.S. Five years Professor of Anatomy, Thirty-eight years Professor of Surgery, Albany Medical College; Surgeon-in-Chief, Albany Hospital; Consulting Surgeon, South End Dispensary; Consulting Surgeon, Benedictine Hospital, Kingston, N. Y.; Consulting Surgeon, Champlain Valley Hospital, Plattsburgh, N. Y.; Consulting Surgeon, Crippled and Ruptured Children, West Haverstraw, N. Y.; Fellow of the American Surgical Association (President, 1906); Fellow of the British Gynecological Society; Member of the American Medical Association (First Vice-president, 1915); Member of the Southern Surgical and Gynecological Association; Corresponding Member of the Boston Gynecological Society; Vice-Chancellor of the Board of Regents of the University of the State of New York. *Executive Council*, 1889–1891, 1895–1905; *President*, 1892. 28 Eagle Street, Albany, N. Y.

1913.—VANDER VEER, EDGAR ALBERT, PH.D., M.D., F.A.C.S. Attending Surgeon Albany Hospital; Consulting Surgeon, Champlain Valley Hospital, Plattsburgh, N. Y. Residence, 150 State St.; Office, 28 Eagle St., Albany N. Y.

1912.—VAN SWERINGEN, BUDD, M.D. 208 Washington Boulevard, Fort Wayne, Indiana.

1909.—WADE, HENRY ALBERT, M.D., F.A.C.S. Visiting Surgeon to Bethany Deaconess's Hospital; Attending Gynecologist to Williamsburg Hospital, Brooklyn. 495 Greene Avenue, Brooklyn, N. Y.

1909.—WALDO, RALPH, M.D., F.A.C.S. Gynecologist to Lebanon Hospital; Associate Surgeon to the Woman's Hospital of the State of New York; Consulting Obstetrician, Jewish Maternity Nyack Hospital and Rockaway Beach Hospital. 54 W. 71st Street, New York, N. Y.

1891.—WALKER, EDWIN, M.D., Ph.D., F.A.C.S. Gynecologist to the Evansville City Hospital; President of the Indiana State Medical Society, 1892; Member of the American Medical Association and of the Mississippi Valley Medical Association; Member of the Southern Surgical and Gynecological Association; First Vice-president American Medical Association, 1907. *Vice-president*, 1901. 712 South Fourth Street, Evansville, Ind.

1907.—WEISS, EDWARD ALOYSIUS, M.D., F.A.C.S. Gynecologist to Mercy Hospital; Gynecologist to Presbyterian Hospital; Obstetrician to Rosalia Maternity Hospital; Assistant Professor of Gynecology at University of Pittsburgh, Medical Department. 714 Jenkins Building, Pittsburgh, Pa.

1914.—WELTON, THURSTON SCOTT, M.D. Associate Visiting Gynecologist, Williamsburgh Hospital, Brooklyn; Residence and Office, 842 Union Street, Brooklyn, N. Y.

Founder.—WERDER, XAVIER OSWALD, M.D., F.A.C.S. Professor of Gynecology at the University of Pittsburgh, Medical Department; Gynecologist to Mercy Hospital. *Treasurer*, 1888–1911. *President*, 1911. 714 Jenkins Building, Pittsburgh, Pa.

1904.—WEST, JAMES NEPHEW, M.D., F.A.C.S. Professor of Diseases of Women and Secretary of the Faculty at the New York Post-Graduate Medical School and Hospital. *Vice-president*, 1906. 71 West Forty-ninth Street, New York.

1896.—WESTMORELAND, WILLIS FOREMAN, M.D., F.A.C.S. Professor of Surgery at the Atlanta Medical College. Suite 241, Equitable Building, Atlanta, Ga.

1911.—WHITE, GEORGE R., B.S., M.D., F.A.C.S. Surgeon Park View Sanitarium. 2 Liberty E., Savannah, Ga.

1916.—WING, LUCIUS ARTHUR, B.Sc., M.D., Attending Surgeon, Lying-In Hospital, City of New York; Assisting Surgeon, St. Mary's Free Hospital for Children; Instructor in Clinical Surgery, Cornell University Medical College. Office and Residence 116 East Sixty-third St., New York, N. Y.

1909.—YATES, H. WELLINGTON, M.D., F.A.C.S. Gynecologist to St. Mary's Hospital; Gynecologist to Providence Hospital; Assistant Professor of Gynecology, Detroit College of Medicine and Surgery; Member of the Section on Obstetrics, Gynecology and Abdominal Surgery of the American Medical Association; Member of the Staff of St. Luke's Hospital; Member of the Wayne County and Michigan State Medical Society; President Detroit Medical Club; Medical Director of the Peninsular Life Insurance Co. Residence, 1360 Fort Street, West; Office, 607 Gas Office Building, Detroit, Mich.

1907.—ZIEGLER, CHARLES EDWARD, A.M., M.D., F.A.C.S. Professor of Obstetrics in the University of Pittsburgh; Medical Director of the Elizabeth Steele Magee Hospital for Women; Medical Director of the Pittsburgh Maternity Dispensary; Consulting Obstetrician to the Columbia Hospital and Consulting Obstetrician and Gynecologist to the Dixmont Hospital for the Insane. Forbes and Halket Streets, Pittsburgh, Pa.

1900.—ZINKE, ERNST GUSTAV, M.D., F.A.C.S., Professor of Obstetrics and Clinical Midwifery in the Ohio-Miami Medical College, University of Cincinnati, 1896–1916. Emeritus Professor of Obstetrics, 1916. Honorary Chief of Staff, and Obstetrician and Gynecologist to the German Hospital; President of the Cincinnati Obstetric Society, 1887; President Academy of Medicine of Cincinnati, 1894; Member and Chairman of Section on Obstetrics, Gynecology and Abdominal Surgery, American Medical Association, 1914; Honorary Member Jackson County Medical Society, Kansas City, Mo.; Honorary Member, Cincinnati Obstetric Society. *President*, 1908. Executive Council 1909–1911. Secretary. 4 West Seventh St., Cincinnati, Ohio.

Total, one hundred and thirty-five Ordinary Fellows.

ORDINARY FELLOWS, DECEASED.

1890.—ASDALE, WILLIAM JAMES, M.D., Beaver Falls, Pa., 1912.

Founder.—BAKER, WASHINGTON HOPKINS, M.D., Philadelphia, Pa., 1904.

1889.—BURNS, BERNARD, M.D., Allegheny, Pa., 1892.

1890.—COLES, WALTER, M.D., St. Louis, Mo., 1892.

1889.—DAVIS, WILLIAM ELIAS B., M.D., Birmingham, Ala., 1903.

1892.—DORSETT, WALTER BLACKBURN, M.D., F.A.C.S., St. Louis, Mo., 1915.

1892.—DUFF, JOHN MILTON, A.M., M.D., Ph.D., Pittsburg, Pa., 1904.

1898.—DUNN, JAMES C., M.D., Pittsburg, Pa., 1907.

1892.—DUNNING, LEHMAN HERBERT, M.D., Indianapolis, Ind., 1906.

1895.—FERGUSON, ALEXANDER HUGH, M.D., Chicago, Ill., 1911.

1890.—FREDERICK, CARLTON CASSIUS, B.S., M.D., Buffalo, N.Y., 1911.

1891.—GIBBONS, HENRY, JR., A.M., M.D., San Francisco, Cal., 1912.

1904.—GOODFELLOW, GEORGE E., M.D., Los Angeles, Cal., 1910.

1913.—GRAY, FRANK D., M.E.D., M.D. F.A.C.S., Jersey City, N.J., 1916.

1892.—HAGGARD, WILLIAM DAVID, JR., M.D., Nashville, Tenn., 1901.

Founder.—HILL, HAMPTON EUGENE, M.D., Saco, Me., 1894.

1912.—HOTALING, ALBERT STEUBEN, M.D., Syracuse, N. Y., 1913.

1898.—HYDE, JOEL W., M.D., Brooklyn, N. Y., 1907.

1897.—INGRAHAM, HENRY DOWNER, M.D., Buffalo, N. Y., 1904.

Founder.—JARVIS, GEORGE CYPRIAN, M.D., Hartford, Conn., 1900.

1892.—JELKS, JAMES THOMAS, M.D., Hot Springs, Ark., 1902.

1910.—JENKS, NATHAN, B.S., M.D., F.A.C.S., Detroit, 1916.

1900.—LINVILLE, MONTGOMERY, A.B., M.D., New Castle, Pa., 1910.

Founder.—LOTHROP, THOMAS, M.D., Buffalo, N. Y., 1902.

1891.—MCCANN, JAMES, M.D., Pittsburgh, Pa., 1893.

1898.—MCCANN, THOMAS, M.D., Pittsburgh, Pa., 1903.

1896.—MOONEY, FLETCHER D., M.D., St. Louis, Mo., 1897.

1894.—MURPHY, JOHN BENJAMIN, A.M., M.D., F.A.C.S., Chicago, Ill., 1916.

Founder.—POTTER, WILLIAM WARREN, M.D., Buffalo, N. Y., 1911.

Founder.—PRICE, JOSEPH, M.D., Philadelphia, Pa., 1911.

1896.—RHETT, ROBERT BARNWELL, JR., M.D., Charleston, S. C., 1901.

1889.—ROHE, GEORGE HENRY, M.D., Baltimore, Md., 1899.

1892.—ROSENWASSER, MARCUS, M.D., Cleveland, O., 1910.

1890.—ROSS, JAMES FREDERICK WM., M.D., C.M., L.R.C.P., Toronto, Ontario, Canada, 1911.

1889.—SEYMOUR, WILLIAM WOTKYNS, A.B., M.D., Troy, N. Y., 1904.

1902.—SIMONS, MANNING, M.D., Charleston, S. C., 1911.

Founder.—TOWNSEND, FRANKLIN, A.M., M.D., Albany, N. Y., 1895.

1907.—VANCE, AP MORGAN, M.D., F.A.C.S., Louisville, Ky., 1915.

ORDINARY FELLOWS.

Classified.

ALABAMA.

Davis, John D. S.,	2031 Avenue G.,	Birmingham.
Morris, Lewis Coleman,	1203 Empire Bldg.,	Birmingham.
Torrance, Gaston,	325 Woodward Bldg.,	Birmingham.

ARKANSAS.

Runyan, Joseph Phineas,	1514 Schiller Ave.,	Little Rock.

CALIFORNIA.

Buteau, Samuel H.,	1155 Broadway,	Oakland.
Hadden, David,	Oakland Bank of Savings Bldg.,	Oakland.

CANADA.

Howitt, Henry,	221 Woolwich Street,	Guelph, Ontario.
Olmsted, Ingersoll,	215 South James St.,	Hamilton, Ontario.

GEORGIA.

Noble, George Henry,	186 South Pryor Street,	Atlanta.
Westmoreland, W. F.,	241 Equitable Bldg.,	Atlanta.
White, George R.,	2 Liberty E.,	Savannah.

ILLINOIS.

Bacon, Joseph Barnes,		Macomb.
Barrett, Channing,	446 St. James Place,	Chicago.
Goldspohn, Albert,	34 Washington St.,	Chicago.
Lyons, John A.,	4118 State Street,	Chicago.
Percy, James F.,	147 S. Cherry St.,	Galesburg.

INDIANA.

Walker, Edwin,	712 South Fourth St.,	Evansville.
Porter, Miles F.,	207 West Wayne St.,	Fort Wayne.
Rosenthal, M. I.,	336 West Berry St.,	Fort Wayne.
Van Sweringen, Budd,	208 Washington Blvd.,	Fort Wayne.
Clark, Edmund D.,	Hume Mansur Bldg.,	Indianapolis.
Eastman, Thomas B.,	309 Pennway Bldg.,	Indianapolis.
Noble, Thomas B.,	427 Newton Claypool Bldg.,	Indianapolis.
Pantzer, Hugo O.,	224 North Meridian St.,	Indianapolis.
Pfaff, O. G.,	1337 North Pennsylvania St.,	Indianapolis.
Sutcliffe, John A.,	155 East Market St.,	Indianapolis.

IOWA.

Ruth, Charles E.,	407 Equitable Bldg.,	Des Moines.

KENTUCKY.

Frank, Louis,	The Atherton,	Louisville.
McMurtry, Lewis S.,	The Atherton,	Louisville.
Sherrill, Joseph G.,	The Atherton,	Louisville.

MAINE.

Leighton, Adam P.,	192 State St.,	Portland.

MARYLAND.

Branham, Joseph H.,	2200 Eutaw Place,	Baltimore.
Sellman, William A. B.,	5 East Biddle St.,	Baltimore.
Smith, William S.,	528 Hanover St.,	Baltimore.

MICHIGAN.

Abrams, Edward Thomas,		Dollar Bay.
Bell, John Norval,	506 Washington Arcade,	Detroit.
Brown, Geo. Van Amber,	32 Adams Ave., West,	Detroit.
Carstens, J. Henry,	620 Woodward Ave.,	Detroit.
Davis, James E.,	821 West Fort St.,	Detroit.
Longyear, H. W.,	271 Woodward Ave.,	Detroit.
Manton, Walter P.,	32 Adams Ave., West,	Detroit.
Yates, H. Wellington,	1360 Fort Street,	Detroit.

MINNESOTA.

Litzenberg, Jennings C.,	Donaldson Bldg.,	Minneapolis.

MISSOURI.

Brown, John Young,	612 Metropolitan Bldg.,	Saint Louis.
Crossen, H. S.,	Metropolitan Bldg.,	Saint Louis.
Elbrecht, Oscar H.,	Metropolitan Bldg.,	Saint Louis.
Jonas, Ernst,	465 North Taylor Ave.,	Saint Louis.
Kirchner, Walter C. G.,	Metropolitan Bldg.,	Saint Louis.
Reder, Francis,	6346 Berlin Ave.,	Saint Louis.
Schwarz, Henry,	440 North Newstead Ave.,	Saint Louis.

NEBRASKA.

Findley, Palmer,	418 Brandeis Theater Bldg.,	Omaha.

NEW JERSEY.

Strasser, August A.,	115 Beech St.,	Arlington.
Darnall, Wm. Edgar,	1704 Pacific Ave.,	Atlantic City.
Marvel, Emery,	1801 Pacific Ave.,	Atlantic City.
Dickinson, Gordon K.,	280 Montgomery St.,	Jersey City.
Ill, Charles L.,	188 Clinton Ave.,	Newark.
Ill, Edward J.,	1002 Broad St.,	Newark.
Hedges, Ellis W.,	703 Watchung Ave.,	Plainfield.

NEW YORK.

Boyd, James P.,	152 Washington Ave.,	Albany.
Vander Veer, Albert,	28 Eagle Street,	Albany.
Vander Veer, Edgar A.,	150 State St.,	Albany.
Wade, Henry A.,	495 Greene Ave.,	Brooklyn.
Welton, T. Scott,	842 Union St.,	Brooklyn.
Congdon, Chas. E.,	859 Humboldt Parkway,	Buffalo.
Hayd, H. E.,	493 Delaware Ave.,	Buffalo.
King, James E.,	1248 Main St.,	Buffalo.
Lothrop, Earl P.,	153 Delaware Ave.,	Buffalo.
Potter, Irving W.,	420 Franklin St.,	Buffalo.
Chandler, George,	11 East Chestnut St.,	Kingston.
Peck, George A.,	189 Centre Ave.,	New Rochelle.
Bainbridge, W. S.,	34 Gramercy Place,	New York.
Bandler, S. W.,	134 West Eighty-seventh St.,	New York.
Davis, Asa B.,	42 East 35th St.,	New York.
Erdmann, John F.,	60 West Fifty-Second St.,	New York.
Furniss, Harry Dawson,	393 West End Ave.,	New York.
Harrar, James A.,	29 East Seventy-seventh St.,	New York.
Hill, I. L.,	616 Madison Ave.,	New York.
Lynch, Jerome Morley,	57 East 52nd St.,	New York.
Lobenstine, R. W.,	155 East Seventieth St.,	New York.
McPherson, Ross A.,	20 West Fiftieth St.,	New York.
Meeker, Harold D.,	220 West 79th St.,	New York.
Morris, R. T.,	616 Madison Ave.,	New York.
Rongy, Abraham J.,	154 Henry St.,	New York.
Stewart, Douglas H.,	128 West 86th St.,	New York.
Waldo, Ralph,	54 West 71st St.,	New York.
West, James N.,	71 West Forty-ninth St.,	New York.
Wing, Lucius A.,	116 East Sixty-third St.,	New York.
Moriarta, Douglas C.,	511 Broadway,	Saratoga Springs.
Sadlier, James E.,	295 Mill St.,	Poughkeepsie.
Poucher, John W.,	339 Mill St.,	Poughkeepsie.
Miller, A. B.,	326 Montgomery St.,	Syracuse.

NORTH CAROLINA.

Lott, Henry Stokes,	123 Cherry St.,	Winston.

OHIO.

Bonifield, Chas. L.,	409 Broadway,	Cincinnati.
Hall, Joseph A.,	628 Elm St.,	Cincinnati.
Hall, Rufus B.,	628 Elm St.,	Cincinnati.
Miller, John D.,	N. E. Cor. Clifton & McMillan,	Cincinnati.
Reed, C. A. L.,	The Groton,	Cincinnati.
Stark, Sigmar,	1108 East McMillan St.,	Cincinnati.
Tate, Magnus A.,	19 West Seventh St.,	Cincinnati.
Zinke, E. Gustav,	4 West Seventh St.,	Cincinnati.
Crile, George W.,	Osborn Bldg.,	Cleveland.
Humiston, William H.,	536 Rose Bldg.,	Cleveland.

Lincoln, Walter R.,	Lennox Bldg.,	Cleveland.
Scott, N. Stone,	603 Citizens Bldg.,	Cleveland.
Skeel, Arthur,	1834 East 65th St.,	Cleveland.
Skeel, Roland Edward,	314 Osborn Bldg.,	Cleveland.
Baldwin, James F.,	405 East Town St.,	Columbus.
Crotti, André,	1728 East Broad St.,	Columbus.
Goodman, Sylvester J.,	238 State St.,	Columbus.
Hamilton, Chas. S.,	142 South Garfield St.,	Columbus.
Stamm, Martin,	316 Napoleon St.,	Fremont.
Dice, Wm. Gordon,	240 Michigan St.,	Toledo.
Gillette, Wm. J.,	1613 Jefferson St.,	Toledo.
Jacobson, Julius H.,	2050 Franklin St.,	Toledo.
Moots, Chas. W.,	The Nicholas,	Toledo.
Smead, Lewis F.,	242 Michigan St.,	Toledo.
Smith, Chas. N.,	234 Michigan St.,	Toledo.
McClellan, Benjamin B.,	7 East Second St.,	Xenia.

PENNSYLVANIA.

Kennedy, James W.,	1409 Spruce St.,	Philadelphia.
Blume, Frederick,	Jenkins Bldg.,	Pittsburg.
Foster, Curtis S.,	308 Diamond Bank Bldg.	Pittsburg.
Freeland, James R.,	4715 Fifth Ave.,	Pittsburg.
Huggins, R. R.,	1018 Westinghouse Bldg.,	Pittsburg.
Langfitt, William S.,	Jenkins Bldg.,	Pittsburg.
Sanes, K. I.,	Park Bldg.,	Pittsburg.
Schildecker, Charles B.,	1105 Park Bldg.,	Pittsburg.
Simpson, Frank F.,	Jenkins Bldg.,	Pittsburg.
Smith, Louis Watson,	1624 Station St.,	Pittsburg.
Stillwagen, Charles A.,	524 Pennsylvania Ave.,	Pittsburg.
Swope, Lorenzo W.,	1105 Park Bldg.,	Pittsburg.
Weiss, Edward A.,	714 Jenkins Bldg.,	Pittsburg.
Werder, Xavier O.,	Jenkins Bldg.,	Pittsburg.
Ziegler, Chas. E.,	354 South Highland Ave.,	Pittsburg.

RHODE ISLAND.

Jones, Arthur T.,	81 Elm Grove Ave.,	Providence.
Keefe, John W.,	259 Benefit St.,	Providence.

TENNESSEE.

Haggard, William D.,	148 Eighth Ave., North,	Nashville.

VIRGINIA.

Baughman, Greer,	26 North Laurel St.,	Richmond.
Bosher, Lewis C.,	422 East Franklin St.,	Richmond.

MINUTES OF THE PROCEEDINGS

AT THE

TWENTY-NINTH ANNUAL MEETING

OF THE

AMERICAN ASSOCIATION

OF

OBSTETRICIANS AND GYNECOLOGISTS

HELD AT

HOTEL CLAYPOOL

INDIANAPOLIS, IND.

SEPTEMBER 25, 26, AND 27, 1916

TWENTY-NINTH ANNUAL MEETING.

SEPTEMBER 25, 26 AND 27, 1916.

The following-named Fellows were present:

BAINBRIDGE, WM. SEAMAN, . . NEW YORK, N. Y.
BALDWIN, J. F.,. . . . . COLUMBUS, OHIO.
BARRETT, CHANNING, W., ... CHICAGO, ILL.
BELL, JOHN N., ... DETROIT, MICH.
BROWN, GEO. VAN AM., ... DETROIT, MICH.
CARSTENS, J. H., ... DETROIT, MICH.
CLARK, E. D., ... INDIANAPOLIS, IND.
CRILE, GEO. W., ... CLEVELAND, OHIO.
DARNALL, EDGAR, ... ATLANTIC CITY, N. J.
DAVIS, JAMES, E., ... DETROIT, MICH.
DAVIS, J. D. S., ... BIRMINGHAM, ALA.
DICKINSON, GORDON K., ... JERSEY CITY, N. J.
EASTMAN, THOS. B., ... INDIANAPOLIS, IND.
ELBRECHT, O., ... ST. LOUIS, MO.
FINDLEY, PALMER, ... OMAHA, NEB.
GOLDSPOHN, A., ... CHICAGO, ILL.
GOODMAN, SYLVESTER, ... COLUMBUS, OHIO.
HADDEN, DAVID, ... OAKLAND, CAL.
HALL, RUFUS B., ... CINCINNATI, OHIO.
HAYD, H. E., ... BUFFALO, N. Y.
HUGGINS, R. R., ... PITTSBURG, PA.
HUMISTON, W. H., ... CLEVFLAND, OHIO.
ILL, CHAS. L., ... NEWARK, N. J.
ILL, E. J., ... NEWARK, N. J.
JACOBSON, J. H., ... TOLEDO, OHIO.
JONES, ARTHUR T.,. . . . . PROVIDENCE, R. I.
KEEFE, JOHN WM.,. . . . . PROVIDENCE, R. I.
KING, JAMES E., ... BUFFALO, N. Y.
LITZENBERG, JENNINGS C., . . . MINNEAPOLIS, MINN.
MARVEL, EMERY, ... ATLANTIC CITY, N. J.
McCLELLAN, BEN. R., ... XENIA, OHIO.
MILLER, AARON B.,. . . . . SYRACUSE, N. Y.

MOOTS, CHARLES W., ... TOLEDO, OHIO.
MORIARTA, D. C., ... SARATOGA SPRINGS, N. Y.
NOBLE, THOS. B., ... INDIANAPOLIS, IND.
PANTZER, HUGO O., ... INDIANAPOLIS, IND.
PECK, GEORGE, ... NEW ROCHELLE, N.Y.
PERCY, JAMES F., ... GALESBURG, ILL.
PFAFF, O. G., ... INDIANAPOLIS, IND.
POTTER, IRVING W., ... BUFFALO, N. Y.
REDER, FRANCIS, ... ST. LOUIS, MO.
RONGY, A. J., ... NEW YORK, N. Y.
ROSENTHAL, MAURICE, ... FORT WAYNE, IND.
SADLIER, J. E., ... POUGHKEEPSIE, N. Y.
SELLMAN, WM. B., ... BALTIMORE, MD.
SCHWARZ, HENRY, ... ST. LOUIS, MO.
SKEEL, A. J., ... CLEVELAND, OHIO
SKEEL, R. E., ... CLEVELAND, OHIO.
SMEAD, LEWIS, ... TOLEDO, OHIO.
STARK, SIGMAR, ... CINCINNATI, OHIO.
STRASSER, AUGUST A., ... ARLINGTON, N. J.
SUTCLIFFE, J. A., ... INDIANAPOLIS, IND.
TATE, MAGNUS A., ... CINCINNATI, OHIO.
WEISS, EDWARD A., ... PITTSBURG, PA.
WERDER, X. O., ... PITTSBURG, PA.
YATES, H. WELLINGTON, ... DETROIT, MICH.
ZINKE, E. GUSTAV, ... CINCINNATI, OHIO.
Total, 57.

The following-named guests were extended the privileges of the floor and invited to participate in the discussions:

Alburger, Henry R., ... Indianapolis, Ind.
Amos, E. M., ... Indianapolis, Ind.
Boice, J. Morton, ... Philadelphia, Pa.
Brayton, Allenbert W., ... Indianapolis, Ind.
Cameron, Wm. H., ... Pittsburg, Pa.
Courtney, T. E., ... Indianapolis, Ind.
Day, Clark E., ... Indianapolis, Ind.
Dow, David C., ... Cambridge, Mass.
Emerson, C. P., ... Indianapolis, Ind.
Erdman, Bernhard, ... Indianapolis, Ind.
Ferguson, C. E., ... Indianapolis, Ind.
Fresse, E M., ... Columbus, Ohio.

Graham, Hannah, ... Indianapolis, Ind.
Graham, A. B., ... Indianapolis, Ind.
Hobbs, Alice L., ... Indianapolis, Ind.
Humes, Chas. D., ... Indianapolis, Ind.
Irwin, John C., ... Pittsburg, Pa.
Kennedy, T. C., ... Indianapolis, Ind.
McElroy, J. L., ... Indianapolis, Ind.
Mountain, J. R., ... Connersville, Ind.
Naull, Chas. M., ... Indianapolis, Ind.
Ottinger, R. C., ... Indianapolis, Ind.
Padgett, Everett E., ... Indianapolis, Ind.
Rosnagle, Francis, E. . . . . E. London, Ohio.
Ross, David, ... Indianapolis, Ind.
Runnels, O. S., ... Indianapolis, Ind.
Sexton, John C., ... Rushville, Jnd.
Smiley, Orvall, ... Indianapolis, Ind.
Spurney, Albert, F., ... Cleveland, Ohio.
Storms, R. B., ... Indianapolis, Ind.
Swanson, Jake, ... Columbus, Ohio.
Thompson, H. H., ... Noblesville, Ind.
Webb, John W., ... Indianapolis, Ind.
Wheeler, H. H., ... Indianapolis, Ind.
Whitford, Wm., ... Chicago, Ill.
Williams, Luther, ... Indianapolis, Ind.
Wishard, W. N., ... Indianapolis, Ind.
Witt, L., ... Indianapolis, Ind.
Yatch, W. V., ... Indianapolis, Ind.
Total, 39.

FIRST DAY—*Monday, September* 25, 1916.

Morning Session.—The Association met in the Palm Room of Hotel Claypool at 10 : 00 A. M., and was called to order by the President, Dr. Hugo O. Pantzer, Indianapolis, Indiana.

The Hon. Joseph E. Bell, Mayor of Indianapolis, was introduced and delivered the following

ADDRESS OF WELCOME.

Mr. President and Fellows of the American Association of Obstetricians and Gynecologists: Of course, I am glad to see you here this morning, as we are glad to see all who come to visit the Capitol of Indiana. I extend to you, on behalf of the people of this city, a

cordial welcome not only because of the long distances most of you have come, but because of the wonderful profession in which you are engaged—a profession which has to do with us as we come into this world. This city, noted for its conventions, never had a brighter smile than it has this morning to welcome you.

We are in the midst of a wonderful era, a time when progress is being made in every line. Every profession, every science, every occupation is moving to a higher standard to the end that the atmosphere in which we live may be made better, may be put upon a more substantial, a more helpful basis. You come together, I take it, to accomplish that one thing, and as the result of your conference here new ideals and new ideas will be promulgated for the betterment of mankind. All professions, all occupations in this day and time are working to better the conditions under which we live. We are coming to recognize the fact that it is not so much to cure disease as it is to prevent it, and so it is not only with your work, but with work in every line and occupation. I bid you a hearty welcome to Indianapolis, and hope your stay may be such that you will remember Indianapolis as a beautiful and bright convention city. (Applause.)

THE PRESIDENT.—It is with especial interest that I introduce to you the next speaker, an old chum at college, Dr. John H. Oliver, who will address you in behalf of the profession of Indianapolis and of Indiana.

ADDRESS OF WELCOME BY DR. OLIVER.

Mr. President and Fellows of the American Association of Obstetricians and Gynecologists: In coming into the hotel this morning the Latin phrase "*Sic transit gloria mundi*" was fresh in my mind. Not being absolutely sure as to which one of the hotels you were to honor by your presence, I stepped up to the desk and asked one of the clerks if the American Association of Obstetricians and Gynecologists was to hold its meeting here this morning. He glanced at me for a moment, scratched his head and said: "Are they the automobile club?" (Laughter.)

In resurrecting an old magazine the other day from a long unused desk, I came across an article concerning the delivery of a famous address by Daniel Webster on the occasion of the second visit of LaFayette to this country. It seems that Webster was on the eve of going on a fishing trip on the coast of Massachusetts, and the committee in charge of this occasion made a request of Webster to make a speech on the event of LaFayette's visit. Webster most graciously accepted the invitation, and the fisherman then went on his way.

During the day his companions noted that the great orator was more absorbing than they were, and standing on the deck of his schooner, line in hand, a vicious tug came to his line, and those who were near him heard him say, after he got another tug at his line "Welcome fish; you are hooked," and he landed a big fish on the deck. Sitting back in characteristic attitude and gesture, he addressed them somewhat as follows: "Denizens of the deep, you are thrice welcome to our shores." (Laughter and applause.)

To paraphrase slightly what the great statesman said on that occasion, representing the doctors of Indianapolis and Indiana, I extend to you, illustrious denizens of other cities and states, a thrice welcome of every Indianapolis doctor.

Our statesmen and townspeople and orators have been in the habit of characterizing this good city as an old city, and I think I can say within the pale of truth that this city is no older than any of your home cities.

There are some things our good Mayor seemingly neglected to say. Among them that Indianapolis is the home of many hospitals, public and private; and on behalf of the management of these hospitals, I extend to you a cordial welcome to visit them at any time to suit your convenience and make yourself at home.

There are other things of interest to doctors here. We have a very large and beautiful cemetery here and many small ones for those who think of retiring. (Laughter.) We have a large crematory, and many funeral directors, who are so adept in their profession that I never hear a word of complaint from any of them, and to these necessary accessories of the medical profession I also extend you to a cordial welcome. (Laughter.)

I am sure, the profession of Indianapolis will stand ready to entertain you as best they can, and again I extend to you, as Webster did to LaFayette, a thricefold welcome to this city. (Applause.)

RESPONSE TO THE ADDRESSES OF WELCOME BY DR. GORDON K. DICKINSON, JERSEY CITY, NEW JERSEY.

Mr. President and Fellows of the American Association of Obstetricians and Gynecologists: It is impossible to respond to the address of welcome delivered by the Mayor because he runs out as soon as he finds somebody else is going to talk of him, and I presume that is considered good politics. (Laughter.)

I am greatly impressed with Indianapolis. We hardly take up a morning paper in our section of the country, New York, but what we see some item from Indianapolis. It does seem as if this town had

become the hub of the United States. There is always something doing here, always something originating here, and it was with that notion last year that I was one of those who seconded the motion to come to Indianapolis. I wanted to see the place in which so much was going on in the United States. Here we find we are also practically the center of population. We find the ambitious people of the north and those of the genial south coming together, and the two extremes of the east and west are met here, so much so that it reminds me very much of an expression of our friend Professor Wood, "The eye of the *vox populi* is upon us." It is fit also that our Association should meet here—an Association which to my mind is the best we have in the United States because it is composed of the three important branches of surgery, obstetrics, gynecology and the peritoneum. We are all working for one harmonious big surgery, and we are succeeding, and we are producing papers and doing work which is befitting. So I hope that while we are here we will produce some impression upon the atmosphere of Indianapolis; that we will have some effect upon the people here because of their heterogeneous make-up, and that the work of Pantzer and Pfaff and others may be facilitated. (Applause.)

RESPONSE TO THE ADDRESSES OF WELCOME BY DR. ORANGE G. PFAFF, INDIANAPOLIS.

Mr. President, Dr. Oliver and Fellows of the American Association of Obstetricians and Gynecologists: On behalf of this Association I want to thank Dr. Oliver, for his kind and generous address of welcome. This response, which you elicit from me, is perhaps given in return with a little more pleasure than certain other responses, which have emanated from the same source, following some of your professional products.

We come to Indianapolis not as strangers; we have been here before, and so we come with some knowledge of the virtues of the Capitol city of Indiana. We have known for a great many years that it has been quite a railroad city; but in recent years that term has rather been pushed aside for the present name which it enjoys, namely, the home of vice-presidential candidates. We are never without one. (Laughter.) We also know that we enjoy the reputation, at least, of being the literary center of America. There is a long list of illustrious names to bolster up this statement, and among them I would mention our beloved James Whitcomb Riley. (Applause.)

In addition to the fact that Indianapolis has done some things in a

scientific, political and business way, we will call your attention to the fact that there have been some notable advances made in medicine here; that milestones marking the progress in medical history have been placed by the hands of those who formerly made their homes in Indianapolis. On the walls of the beautiful library building, now nearing completion, will soon be unveiled a tablet in memory of Bobbs; and this tablet will state that in 1867, I forget the exact date, Dr. Bobbs performed in this city the first operation for gall-stones recorded in medical literature.

There was another man, formerly a resident of Indianapolis for many years and a practitioner here who did a most notable deed. A few years ago I was invited to participate in the unveiling of a monument at Newtown, Ohio, a suburb of Cincinnati, to the memory of Dr. Richmond. Dr. Richmond, located at that time near Newtown, in response to the call of duty went across a flooded country in a skiff and to a log cabin in the wilderness, and there by the light of a tallow candle, in the midst of a howling storm, with no assistance, no anesthesia, performed, for the first time, on this Continent, the operation of Cesarean section.

Many other deeds might be recalled on this occasion, but I think we all appreciate the spirit of our hosts, and that we are here for real work. We are a serious-minded association; we care little for diversions at these meetings, and are anxious to devote ourselves to the work in hand. Again, I thank you. (Applause.)

Papers were then read as follows:

1. "Appendicular abscess; complication; hemorrhage; death and report of a case," by Dr. Magnus A. Tate, Cincinnati, Ohio.

The paper was discussed by Dr. Goldspohn.

2. "Drainage for pus conditions in the pelvis during pregnancy," by Dr. Francis Reder, St. Louis, Missouri, which was discussed by Drs. Hayd, Sellman, Skeel, and in closing by the essayist.

3. "Report of a case of rupture of the uterus; sepsis; operation; recovery," by Dr. Rufus B. Hall, Cincinnati, Ohio.

This paper was discussed by Drs. Schwarz, Edw. J. Ill, Carstens, A. J. Skeel, Goodman, Elbrecht, J. E. Davis, Van Amber Brown, Zinke, Bonifield, and discussion closed by the essayist.

4. "Rupture of the uterus in Cesareanized women," by Dr. John N. Bell, Detroit, Michigan.

5. "Rupture of the Cesarean scar," by Dr. A. J. Rongy, New York City.

These two papers were discussed together by Drs. Findley, Car-

stens, Schwarz, J. E. Davis, Rosenthal, Potter, Reder, and discussion closed by the essayists.

On motion, the Association took a recess until 2 : 30 P. M.

Afternoon Session.—The Association reassembled at 2 : 30 P. M., and was called to order by the President.

6. "Cesarean section after death of mother; report of two cases," by Dr. Orange G. Pfaff, Indianapolis, Indiana.

This paper was discussed by Drs. Dickinson, Elbrecht, Edw. J. Ill, and in closing by the essayist.

7. "Gunshot wounds of the abdomen in pregnant women," by Dr. Lewis F. Smead, Toledo, Ohio, which was discussed by Dr. John D. S. Davis.

8. "Teaching of obstetrics under improved conditions," by Dr. Henry Schwarz, St. Louis, Missouri.

This paper was discussed by Drs. Hayd, Tate, and in closing by the essayist.

9. "Lymph gland extract; its preparation and therapeutic action," by Dr. David Hadden, Oakland, California, which was discussed by Drs. J. E. Davis, Dickinson, and discussion closed by the author of the paper.

10. "Observations on blood pressure during operations," by Dr. Charles W. Moots, Toledo, Ohio, which was discussed by Drs. Huggins, Carstens, Dickinson, and discussion closed by the essayist.

On motion, the Association took a recess until 7 : 30 P. M.

Evening Session.—The Association reassembled at 7 : 30 P. M., and was called to order by the First Vice-President, Dr. Gordon K. Dickinson, Jersey City, New Jersey.

11. "President's Address," Dr. Hugo O. Pantzer, Indianapolis, Indiana.

12. "Points in diagnosis of pelvic troubles," by Dr. J. Henry Carstens, Detroit, Michigan.

13. "Considerations in the care of our patients before and after operation," by Dr. H. Wellington Yates, Detroit, Michigan.

14. "Operative judgment as a factor in surgical morbidity," by Dr. Roland E. Skeel, Cleveland, Ohio.

These three papers were discussed together by Drs. Dickinson, Sellman, Goldspohn, Humiston, Bonifield, Bainbridge, J. E. Davis, Elbrecht, and discussion closed by the essayists.

15. "The relief of trifacial neuralgia from removal of the appendix, by Dr. Morris I. Rosenthal, Fort Wayne, Indiana, which was dis-

cussed by Drs. Hayd, Skeel, Stark, Elbrecht, and discussion closed by the essayist.

On motion, the Association adjourned until 9 : 30 A. M., Tuesday.

SECOND DAY—*September* 26, 1916.

Morning Session.—The Association met at 9 : 30 A. M., and was called to order by the President.

16. "Uterine fibromyomata in cardiovascular disease, by Dr. Benjamin R. McClellan, Xenia, Ohio, which was discussed by Drs. Jacobson, Huggins, Carstens, J. E. Davis, and discussion closed by the essayist.

17. "Prolapse of the uterus in nulliparous women," by Dr. Palmer Findley, Omaha, Nebraska.

The paper was discussed by Drs. Stark, Rongy, Bonifield, Edw. J. Ill, Hayd, Elbrecht, Barrett, and discussion closed by the essayist.

18. "Radium, a palliative," by Dr. Douglas C. Moriarta, Saratoga Springs, New York.

The paper was discussed by Drs. R. E. Skeel, Pfaff, Reder, Humiston, and discussion closed by the essayist.

19. "The standarization of definite procedures in gynecological operation," by Dr. E. A. Weiss, Pittsburg, Pennsylvania.

The paper was discussed by Drs. Keefe, Baldwin, Van Amber Brown, J. D. S. Davis, Bonifield, Bainbridge, Hall, Crile, Tate, and discussion closed by essayist.

20. "A modified Gilliam operation and its ultimate results," by Dr. Albert Goldspohn, Chicago, Illinois.

21. "Shortening of the round ligaments by transverse suprapubic incision," by Dr. Sigmar Stark, Cincinnati, Ohio.

These two papers were discussed together by Drs. Humiston, Rosenthal, Barrett, and discussion closed by the essayists.

On motion, the Association took a recess until 2 : 00 P. M.

Afternoon Session.—The Association reassembled at 2 : 00 P. M., and was called to order by the President.

22. "Pathology of the vulvovaginal ducts and glands with lantern slides," by Dr. James E. Davis, Detroit, Michigan.

23. "Heat as a method of treatment in some forms of cavity carcinoma," by Dr. James F. Percy, Galesburg, Illinois.

24. "Surgical treatment of uterine cancer," by Dr. Julius H. Jacobson, Toledo, Ohio

These two papers were discussed together by Drs. Werder, Weiss, Bainbridge, and discussion closed by the essayists.

25. "Practical considerations of surgery of the stomach," by Dr. George W. Crile, Cleveland, Ohio, which was illustrated by motion pictures.

Mr. William J. Brownlow, Cleveland, followed with remarks on value of motion pictures in the teaching of surgery.

The paper of Dr. Crile was discussed by Dr. Jacobson.

On motion, the Association adjourned until 9:00 A. M., Wednesday.

THIRD DAY—*September 27, 1916.*

Morning Session.—The Association met at 9:00 A. M., and was called to order by the President.

26. "Mechanics of the stomach after gastroenterostomy" by Dr. Julius H. Jacobson, Toledo, Ohio. (No discussion.)

27. "Diagnosis of diseases of the right upper quadrant of the abdomen," by Dr. John D. S. Davis, Birmingham, Alabama.

This paper was discussed by Drs. Carstens, Dickinson, Baldwin, Zinke, J. E. Davis, Bainbridge, Goldspohn, and Pantzer.

28. "Excessive drainage complicating surgery upon the common bile duct," by Dr. James A. Sadlier, Poughkeepsie, New York, which was discussed by Drs. Smead, Dickinson, Marvel, Bainbridge, Stark, Peck, Elbrecht, and discussion closed by the essayist.

29. "Diverticulitis of the descending and transverse colon," by Dr. John W. Keefe, Providence, Rhode Island, which was discussed by Dr. Bainbridge and discussion closed by the author of the paper.

30. "Technic of abdominal hysterectomy," by Dr. James F. Baldwin, Columbus, Ohio. (No discussion.)

31. "Inguinal hernia attacked to cord, undescended testicle uterus, tubes and broad ligament," by Dr. Edmund D. Clark, Indianapolis, Indiana. (No discussion.)

32. "Absence of muscular tone an important factor in the etiology of postoperative paralytic ileus," by Dr. R. R. Huggins, Pittsburg, Pennsylvania.

The paper was discussed by Dr. Dickinson.

33. "Chronic intestinal stasis; illustrative cases. Series 1," by William Seaman Bainbridge, New York City.

Discussed by Drs. Emerson, Zinke, J. E. Davis, Bonifield, Tate, and discussion closed by the essayist.

34. "Tuberculosis of the mesenteric gland," by Dr. Arthur T. Jones, Providence, Rhode Island, which was discussed by Drs.

Pantzer, Bonifield, Zinke, Dickinson, and in closing by the author of the paper.

On motion, the Association took a recess until 2:30 P. M.

Afternoon Session.—The Association reassembled at 2:30 P. M., and was called to order by the President.

35. "The relation of so-called ether pneumonia to pelvic and abdominal surgery," by Dr. Willam Edgar Darnall, Atlantic City, New Jersey.

The paper was discussed by Drs. Dickinson, Keefe, Barrett, Sadlier, J. E. Davis, Goldspohn, Reder, Pantzer, and in closing by the essayist.

36. "Hospital management," by Dr. Gordon K. Dickinson, Jersey City, New Jersey.

37. "The surgeons' responsibility to the economics of the hospital," by Dr. Emery Marvel, Atlantic City, New Jersey.

These two papers were discussed together by Drs. Van Amber Brown, Bainbridge, Emerson, Sadlier, Huggins, Reder, Bonifield, and discussion closed by Dr. Dickinson.

At the close of the discussion, Dr. Charles L. Bonifield moved that the incoming President appoint, at his leisure, a committee of three, of which both Drs. Dickinson and Marvel shall be members, to report on some method of procedure to secure the standardization of hospitals.

Seconded by Dr. Brown and carried.

In the absence of Dr. Louis Frank, who was to have read an In Memoriam on Dr. Ap. Morgan Vance, the Secretary did so.

The Secretary also read an In Memoriam on Dr. Nathan Jenks, prepared by Dr. W. P. Manton, Detroit.

Dr. Gordon K. Dickinson, Jersey City, read an In Memoriam on Dr. Frank D. Gray; and Dr. Channing W. Barrett, of Chicago, read an In Memoriam on Dr. John B. Murphy.

INSTALLATION OF OFFICERS.

THE PRESIDENT.—The next thing on the program is the installation of the new President, and it is my pleasant duty to induct this gentleman into office.

I will ask Dr. Bonifield and Dr. Bainbridge to escort the newly elected President, Dr. Keefe, to the Chair.

I feel very grateful for the friendship that has been manifested toward me by my esteemed colleagues, and it is also with great pleasure that I extend to my successor, Dr. Keefe, the gavel of this office. (Applause.)

DR. KEEFE, in accepting the Presidency, said: Gentlemen: I assure you, I feel highly honored by the fact that you have selected me to preside over the deliberations of this very important national society.

Upon reading the Transactions that have been accumulated by this Association, one cannot be but proud of the efforts made by the founders and the men who have followed them. Some of the founders are still with us. They have done a tremendous amount of valuable work during the period in which this Association has existed.

One of the important features of this Association is that in our local societies, in discussing papers, we may be loathe to say exactly what we think; we may have to use a little diplomacy in discussing papers, but here, where we are gathered from all parts of the country, and that in itself is of value, from the Pacific, the Atlantic, from the northern and from the southern parts of our country, we can present our views with freedom. And the discussions, as you know, are not always in a way to pat a man on the back and say what a wonderful man he is; there are several Fellows who can smile and sit gracefully on the reader of the paper if he does not come up to the critic's idea as to how a matter should be presented, or if he thinks the author's views are erroneous. All of these criticisms are made in the best of spirit and without the slightest enmity toward the reader of any paper.

Last night Dr. Bonifield said that thirty or forty years ago there were wonderful teachers in medicine at the different medical schools; that these men stood out as landmarks, and their students were inspired by them and looked up to them many times during the rest of their lives. I feel that in this Association we have intellectual giants, and I know that I shall return to my home with a renewed desire to try and emulate such men. Every one of us has an inherent love in our make-up for his fellowmen, and here again we learn to become acquainted intimately with the different members of the Association, and after meeting them from year to year we learn to love one another. That again is one of the reasons for our coming together annually.

I have great admiration for what our predecessors have done in the past, and still I am optimistic and feel that in the future this Association is going to continue to grow and to progress and make great advances.

Perhaps I am talking at too great a length. If I had the silver tongue of some of our members I might talk longer. But I hope and

wish to meet you all in Newark, New Jersey, a year from this time. (Applause.)

DR. BAINBRIDGE.—I move that a vote of thanks be extended to the local Committee of Arrangements, who have been so untiring in their efforts in our behalf, coupling with that Dr. Eastman, the Chairman of the Committee, our Vice-President and a member of our Executive Council, Dr. Pfaff, and our good friend and ex-President, Dr. Pantzer.

I desire to move that our thanks be extended to that gentleman who is the personification of Germanic efficiency and Chesterfieldian tact; that tireless good fellow, with the best of American geniality, who does so much throughout the year to see that our volume of Transactions comes to us as an example of the work we are doing, and who is working through all of us and by the side of us, that greatly beloved Fellow of our Society, Dr. Zinke. (Applause.)

Furthermore, I wish to move that our thanks be extended to the hotel management for the kind and efficient help and accommodations they have provided to carry on this meeting.

The motion was seconded by several and unanimously carried.

As there was no further business to come before the meeting, on motion, which was duly seconded and carried, the Association adjourned to meet at Newark, New Jersey, subject to the call of the Executive Committee. E. GUSTAV ZINKE, M. D., *Secretary.*

EXECUTIVE SESSIONS.

Monday, September 25, 1916.

The President, DR. HUGO O. PANTZER, in the Chair.

THE PRESIDENT.—It gives me great pleasure, in the name of the Fellows residing in Indianapolis, to extend to you a cordial welcome. We have been looking to this event with great pride and expectation. We hope and wish that this meeting may be successful like its many forerunners were. May your labors in the strenuous days before you give you each and all profit, satisfaction and new ardor for your professional work. May your social experience here be such as will weld you anew to your Fellows and to mankind generally. (Applause.)

I will ask the Secretary what is the first order of business.

THE SECRETARY.—The first in order is to pass on the applications for Fellowship. Dr. James F. Percy, Galesburg, Illinois, has been favorably passed upon and recommended by Dr. J. H. Jacobson and Dr. E. Gustav Zinke. Dr. George Augustus Peck, New Rochelle,

New York, has been recommended for Fellowship by Dr. H. G. Furniss and Dr. Gordon K. Dickinson. Dr. Lucius R. Wing, New York City has been recommended for Fellowship by Dr. John F. Erdmann and Dr. A. B. Davis. All of these gentlemen have complied with the necessary conditions for Fellowship, and all that is necessary is for the Association to vote upon them.

DR. RUFUS B. HALL.—I move that the rules be suspended and that the Secretary be instructed to cast the ballot of the Association for the election of these gentlemen.

Seconded and carried.

The Secretary cast the ballot as instructed.

The Secretary read letters and telegrams of regret from Dr. Robert T. Morris, New York; Dr. John Young Brown, St. Louis, Missouri; Dr. Edgar Vander Veer, Albany, New York; Dr. Lewis F. McMurtry, Louisville, Kentucky, and Dr. H. S. Lott, Winston, North Carolina.

THE PRESIDENT.—The next in order is the Report of the Secretary.

The SECRETARY stated that he had no special report to make except to present his financial statment and to express his gratification of the manner in which he has been supported in his work by the Fellows of the Association during the past year.

The TREASURER then presented his annual report, stating that all bills had been paid up to date. It had cost the Association a little more this year to run its affairs because of binding unbound sets of the Transactions. However, the Association was in good financial condition with a balance of $1208.50 in the Treasury.

To audit the accounts of the Secretary and the Treasurer the President appointed as an Auditing Committee Drs. Charles L. Bonifield and Dr. Francis Reder. The Auditing Committee reported subsequently of having examined the accounts of the Secretary and the Treasurer and found them correct.

It was moved that the report of the Auditing Committee be accepted.

Seconded and carried.

Adjourned.

Tuesday, September 26, 1916.

The Executive Session was called to order by the President at 5:00 P. M.

THE SECRETARY.—The Executive Committee has passed favorably upon the applications of Dr. James F. Percy, Dr. Lucius Arthur Wing, and Dr. George Augustus Peck.

DR. BARRETT.—I move that the rules be suspended and the Secretary be instructed to cast the ballot of the Association for the election of these gentlemen to Fellowship.

Seconded and carried.

The Secretary then cast the ballot as instructed, and the candidates were declared duly elected.

THE PRESIDENT.—The next in order is the election of officers. Nominations for President are in order.

Dr. Charles L. Bonifield nominated Dr. John W. Keefe for President.

The nomination was seconded by Dr. Magnus A. Tate and Dr. O. H. Elbrecht.

Dr. Barrett moved that nominations be closed and the Secretary be instructed to cast the ballot of the Association for Dr. Keefe.

Seconded and carried.

The Secretary cast the ballot as instructed, and Dr. Keefe was declared duly elected.

THE PRESIDENT.—Nominations for First Vice-President are now in order.

Dr. Tate nominated Dr. Francis Reder.

Dr. Bell seconded the nomination, moved that nominations be closed, and that the Secretary be instructed to cast the ballot of the Association for Dr. Reder.

Seconded and carried.

The Secretary cast the ballot as instructed and Dr. Reder was declared duly elected.

THE PRESIDENT.—Nomination for Second Vice-President are now in order.

Dr. Dickinson nominated Dr. Charles Ill, Newark, New Jersey.

Dr. Werder moved that the nominations be closed and the Secretary be instructed to cast the ballot of the Association for Dr. Ill.

Seconded and carried.

The Secretary cast the ballot as instructed, and Dr. Chas. Ill was declared duly elected.

THE PRESIDENT.—Nominations for Secretary.

DR. MOOTS.—As the youngest student of the present Secretary, who is a member of the Association, I crave the honor of presenting the name of our good friend and faithful servant, Dr. Zinke. (Applause.)

DR. BARRETT.—I second the nomination of this dark horse, and move that the President cast the ballot of the Association for Dr. Zinke as Secretary.

Seconded and carried.

The President then cast the ballot as instructed and Dr. Zinke was declared duly elected.

THE PRESIDENT.—Nominations for Treasurer.

Dr. Hall nominated Dr. Hayd to succeed himself as Treasurer.

Dr. Barrett moved that the Secretary be instructed to cast the ballot of the Association for the election of Dr. Hayd.

Seconded and carried.

The Secretary cast the ballot as directed and Dr. Hayd was declared duly elected.

Dr. Orange G. Pfaff, Indianapolis, Indiana, was elected a member of the Executive Council.

THE PRESIDENT.—The next item is the selection of a place in which to hold the next annual meeting.

Dr. Edward J. Ill, nominated Newark, New Jersey.

Dr. Bainbridge seconded the nomination.

Drs. Carstens nominated Detroit, and Dr. Barrett Chicago.

After some discussion Drs. Carstens and Barrett withdrew Detroit and Chicago.

Dr. Bonifield then moved that the Association accept the invitation of Dr. Ill to meet in Newark, New Jersey.

Seconded by Dr. Hall and carried.

The time of meeting is to be decided by the Executive Council.

The Executive Session thereupon adjourned.

E. GUSTAV ZINKE, M. D., *Secretary.*

PAPERS

READ AT THE

TWENTY-NINTH ANNUAL MEETING

OF THE

AMERICAN ASSOCIATION

OF

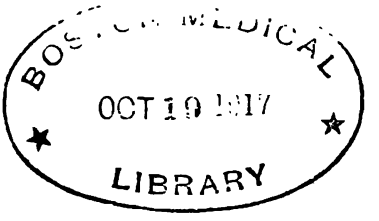
OBSTETRICIANS AND GYNECOLOGISTS

HELD AT

HOTEL CLAYPOOL

INDIANAPOLIS, INDIANA

SEPTEMBER 25, 26 AND 27, 1916



PRESIDENT'S ADDRESS.

BY

HUGO O. PANTZER, M. D., A. M., F. A. C. S.,

Indianapolis, Ind.

THE privilege of Fellowship in this Association came to me at Indianapolis in 1899. The Association had been represented as being composed of men who came to the annual meetings with one purpose, namely, to foster the sciences and arts of obstetrics, gynecology and abdominal surgery. I was told there was tolerated no by-play, no levity in discussions, and no delay over conventional protractions. It was notably a society for its avowed objects, and that in fostering these its members were candid to the degree of being "no respecter of persons". So altruistically was this spirit conceived, that in no instance had this custom interfered with the prevailing good fellowship. I wish here to attest that I have found all this true then and at every meeting since. Fellows, it is my wish that this spirit and course shall prevail at our future meetings!

The many advantages that have accrued to me from my yearly pilgrimages to our gatherings have inspired, sustained and helped me for the arduous labors of each ensuing year. I feel that for this benefit I owe lasting gratitude and a debt to this Association.

The honor you have conferred by electing me President, thereby placing me in line with many fine and noble men who have graced this office, is verily a mark of enviable distinction. I assume that your action flows from kind regards for me and as such your act is the source of great pleasure and satisfaction.

Your coming to Indianapolis this year adds further zest to my joy, and I wish to express to you my full appreciation and my most cordial thanks.

For this meeting, there are announced papers by more than one-third of our members. The 49 scientific papers deal with obstetrics 11 times, with gynecology 18, with abdominal diseases 11, and with all three, including general medicine and surgery, 9 times more.

Great grief has come to us during the last year by the death of four active and highly esteemed fellows, namely: Ap. Morgan Vance,

of Louisville, Kentucky; Nathan Jenks, of Detroit, Michigan; Frank D. Gray, of Jersey City, New Jersey, and lastly the world-famous John B. Murphy, of Chicago, Illinois.

The memorial addresses for the departed Fellows will be the concluding features of the convention.

The marvelous progress of modern medicine is largely based on the development of cellular pathology, biology and bacteriology. Its history has been so well set forth in recent addresses, that I may pass it over. Further progress in medicine is promised upon an unprecedented scale by recent developments in biochemistry, especially as pertaining to organs having an internal secretion, and by the study of the effects of various toxemias upon the normal physiochemistry of the body. Let us hope that so-called functional diseases will soon be traced to their organic bases, and found curable by organo- and sero-therapy. We may hope to prevent and cure many cellular toxic and bacterial diseases by detoxicating and regulating biochemical agents, which diseases at present do not yield to medicinal therapy, and some of which now have their only hope of cure in mutilating operations. But the profusion of scientific data is as yet little correlated and greatly confusing. It is filling our journals, stimulating thought in all spheres of medicine and surgery, and is made the object of experimental search and research all over the world. However, it is at the stage of nascence, and generally speaking, unripe for specific deductions.

The European war has shown its far-reaching baneful effects nowhere more than in the sudden cessation of the prodigious issue from the many laboratories sustained by the belligerent peoples. It serves to emphasize for us in America the relatively small burden of labor and costs we carry in the production of these bounteous benefits to mankind. It is here we may see an opportunity for further national activity and development. Our country has but few institutions correspondingly equipped for original search and research work, and these are almost all creations by private munificence. They often hold private standing and are not connected with a university scheme. Our states do not yet fully recognize the benefit to mankind coming from and the many reasons making it right and prudent for the state to ordain such institutions.

The prevalent separation in practice of gynecology from obstetrics, deplorable as its bearing is upon the development of the science and practice of either branch, was founded upon the frequent collision of dates between the event of a confinement case and the appointed operation. By their respective character, the time of the obstet-

rical event is not precisely calculable and the time for a gynecic or abdominal operation has to be predetermined. Unless both events are arranged to occur in one hospital service, it is impracticable to associate the two kinds of cases in the practice of the same physician or service. The hospital, by its appointments, more particularly by its multiple personnel, meets satisfactorily these double needs.

It has been of great concern to the professional mind that woman in her ordeals of motherhood, has commonly not found the fullest assurance for her safe parturient conduct. I recall to your mind the great solicitude expressed by Dr. Zinke, when he announced, only a few years ago, that all other branches of medicine have profited by the modern advance of medical science, that obstetrics alone in its morbidity and mortality has not shown progress. Let us reflect that while many kinds of medical and surgical cases—some relatively trivial as compared with the importance to the state and family of the mother's case—are self-evidently taken to the hospital; that, on the other hand, the lying-in woman procures this boon and guaranty of safety as yet only in fewest instances; and that while in this time of specialization there are many specialists in all other lines of medicine, in obstetrics there are relatively few, notwithstanding the importance and multitude of these cases.

Regarding the former point, the persistent demand of physicians in large cities has already brought it about so that women now consent or even elect to go to the hospital for their obstetric event. This number is rapidly increasing and has in turn created in many general hospitals special provisions for such cases. The rapidly increasing hospitalization of obstetric cases will demand preparation for them on a new and unprecedented scale. Hospitals solely for women will likely be established everywhere. Some, very properly, will be founded to exist in relation with medical colleges, but a larger number should be provided as separate institutions for the so-called private cases.

Regarding the second point, there are few who specialize in obstetrics to the extent of confining their activity to such practice. There are only a few hospitals throughout the land where obstetric cases collect in numbers to warrant this limitation of practice. In most instances, when the general practitioner in attendance upon a difficult obstetric case wants counsel and aid, it now must come from a fellow general practitioner. In effect the lying-in woman, who is in desperate straits, goes without specialistic skill. Remedy here must be sought and will be found in the reëstablishment of the conjoined specialty of gynecology and obstetrics when the hospitali-

zation of labor cases has become the common practice. This change, unfortunately for the needs of the lying-in woman, is still far off. But this matter must be considered early for the proper enactment of this greater concept of medical duty and task.

Gynecic surgery as a branch or integral part of the work of the general surgeon, although practised by many leading general surgeons, contravenes the leading tendency and ideal aim to scientific specialization. It must be condemned as not assuring the exercise of important diagnostic refinement, special knowledge, and advanced skill. These are only obtained by the intensive cultivation of a limited field. One might as well argue that the general surgeon shall take over again the eye and ear, or throat and nose, which attempt would universally be regarded as preposterous and in its effect calamitous. Abdominal surgery by its development has been an outgrowth of gynecic surgery. But more than this correlation, there is a physiological and an anatomical sameness and continuity of structure that will plead for their continued association, both in study and practice.

But whither are we drifting? I cannot close this address without uttering what seems to me shall and will be the ultimate goal and the happy solution of all these perplexing and formidable questions. Medicine and sanitation must be made a *state-function!* Sanitary science, as an arm of the state, already discloses in its edicts that the interrelation of the sick to the healthy is such that the demands of a greater public interest warrant the state to impose, for instance, quarantine upon the sick and preventive vaccination upon the well. In a state that has nationalized its medicine, the practitioner of medicine under general supervision will correlate these endeavors to effect results. Already such is forecast as where in single instances a group of doctors under one hospital roof unite their efforts for the common patient.

But such generalizations do not meet the immediate objects of this meeting. We have a long and interesting array of papers announced to follow mine this evening.

Fellows, I will here close my remarks with the reiteration of my high appreciation of the distinction you have bestowed upon me.

APPENDICULAR ABSCESS, COMPLICATION, HEMORRHAGE, FOLLOWED BY DEATH.

BY

MAGNUS TATE, M. D., F. A. C. S.,

Cincinnati, Ohio.

IN the practice of abdominal surgery, perplexing problems are constantly met. It is with a twofold purpose that I present the following case report:

First, because I am not cognizant of a similar case in the literature; second, with the hope that in the discussion I may receive valuable information.

A young colored girl asked Dr. White of Covington, Ky., to see her the latter part of March, 1916, because of severe pain in abdomen. The doctor discovered that she had a pronounced tumor in cecal region, and immediately sent the patient to the hospital and requested me to see the case.

Patient, aged twenty-one; unmarried; weight 130 pounds; has had the usual sickness of childhood. No specific or gonorrheal history obtained. She also denied sexual relations. Had always been healthy and strong. Menstruation, regular; lasting about three days. No leukorrhea.

She was taken sick some ten days ago, complaining of severe cramps in the abdomen, accompanied by nausea and vomiting. There was extreme tenderness over the abdomen and a history of chills, followed by fever. Not having been seriously ill before, she thought she had some "stomach trouble," and, therefore, did not ask for medical aid until the pains became very severe and a mass appeared in the right side of the abdomen. Vaginal examination was not made as the hymen was intact, but the rectal touch revealed fulness accompanied by pain. An incision through right rectus muscle brought us immediately upon a large tumor mass which was found posterior to and outside of the cecum. After carefully walling off, a wide opening was made with finger to the outside of the cecum, and a large split rubber drainage tube placed to the bottom of the sac. No search for the appendix was made; no mopping or flushing of cavity; only a few stitches were inserted to partially close the abdominal opening. This was followed by profuse bad smelling discharge for a week. The temperature became normal and the pulse fell to 84 the fourth day after the operation. Pain subsided; bowels moved naturally; and, apparently, a normal convalescence was in progress.

On the tenth day her condition was so favorable that a head rest was allowed for half an hour. The eleventh and twelfth days were equally favorable. During the morning of the thirteenth day, about 1.00 A. M., patient awoke complaining of sharp shooting pains, nausea and faintness. The nurse changed the dressings at 5.00 A. M. and found them to be saturated with blood. Fresh dressings

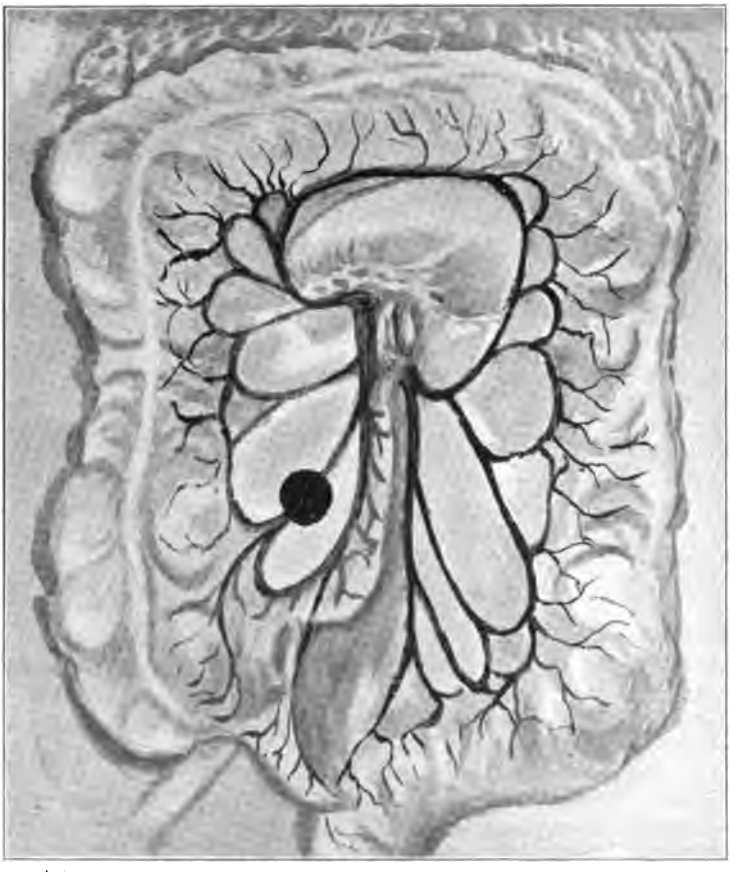


FIG. 1.—(*After Moynahan.*)

were applied five times during that day. The patient continued to complain of pain, nausea and faintness. I saw her with Dr. White the following day, the fourteenth, and her condition was alarming. The dressings were saturated with blood, and the open wound filled with large clots as though we were dealing with a ruptured ectopic gestation. The wound was cleaned and repacked, but the hemorrhage soon reappeared and the patient died that evening at five o'clock.

The nurse informed me later that, a few hours before death, a little blood was found in the stool. We were totally in the dark as to a satisfactory explanation as to the cause and source of the hemorrhage. Nor did I feel at the time I saw her, that a secondary operation was advisable.

An autopsy was obtained and made by Dr. Tarvin in the presence of Dr. White and myself, the abdomen only being opened. The abscess cavity was well walled off and contained some blood. The appendix could not be found and had, apparently, sloughed away. Virgin uterus, tubes and ovaries, showed nothing abnormal. Small and large intestines, kidneys, spleen, stomach and liver were also found normal, with the exception of that part of small intestines adjacent to the abscess cavity, which were blood stained. The small intestines were removed and we found in the mesentery a gangrenous patch, the size of a dime piece, through which one of the branches of the iliocolic artery coursed. Part of mesentery was also blood stained.

It is well known that in the appendiceal region both arteries and veins may be involved; that phlebitis and thrombosis, with their resultant septic embolism and metastatic abscesses, may occur. It is also reported that the iliac artery and vein are subject to erosion, with fatal hemorrhage.

DRAINAGE FOR PUS CONDITIONS IN THE PELVIS DURING PREGNANCY.

BY

FRANCIS REDER, M. D., F. A. C. S.,

St. Louis, Mo.

THE most frequent cause of a pus accumulation in the pelvis during pregnancy must be attributed to a diseased appendix. In the chapter of appendix lesions, a pelvic abscess is most insidious, excepting perhaps the subphrenic abscess. The reason for this is that the diagnosis of appendicitis is often obscured by pregnancy. If the pains and frequent indispositions that usually accompany a pregnant state are not closely scrutinized, and correctly and promptly interpreted by the physician, the primary clinical picture of an attack of appendicitis may be readily overlooked, and only recognized when the more serious phases of the disease have manifested themselves.

Pregnancy does not in any way predispose to appendicitis. There is no doubt, however, that on account of the anatomical changes which take place in the pelvis during pregnancy, appendicitis may terminate in a pus formation more rapidly than in the nonpregnant state.

A close study of the symptoms of an appendix lesion during pregnancy may bring out some clinical points which differ from the usual clinical picture as is found in women who are not pregnant. For instance, before any pus formation has taken place, the pulse and temperature may show little or no change. The pain is usually located in the epigastric region, and remains there till the disease has reached a stage when all pain ceases.

The triad douloureuse of Dieulafoy, over the lower abdomen, is often so blurred by other conditions that it is usually obscured, and its presence is not recognized. Even in an advanced pregnancy, a readily recognizable rigidity of the right rectus is seldom encountered, and only exceptionally does palpation reveal a tender spot over McBurney's point. Nausea and vomiting, two alarming signs

in an attack of appendicitis, count for naught during pregnancy; because both are frequently associated with the toxemia of the latter condition.

Palpation of an abdomen, after the fourth month of gestation, is very unsatisfactory, and it is seldom that any positive conclusions can be drawn from such an examination. Is it, therefore, at all surprising that appendicitis, in its primary stage during pregnancy, is apt to be overlooked? As previously stated, pregnancy favors the rapid development of the pathological stages of appendicitis, and a pus accumulation may be found in the pelvis in a surprisingly short time.

In one patient, pregnant five months, a distinct fluctuation could be detected in Douglas' pouch by rectal palpation on the fourth day after a severe attack of "indigestion." This patient only felt indisposed for two days. On the third day, however, she became very sick. No physician had been consulted before the third day. She said there had been no need for one.

Pus accumulations in the pelvis during pregnancy are favored by the location of the appendix and by the size of the uterus. The appendix that crosses the iliac vessels and hangs into the pelvis, the so-called "three o'clock" position, is the appendix that is a great contributing factor to a pelvic abscess; while a uterus beyond the third month of gestation, when it can be readily palpated through the abdominal wall, materially favors pus collections in the pelvis. This may be explained on the ground that the enlarged uterus, crowding into the abdominal cavity, exercises an undue influence upon the intraabdominal pressure above the pelvic plane, thus favoring fluids to collect in the pelvis. Furthermore, inasmuch as the formation of adhesions about the appendicial region is inhibited because of the rapidity with which the pus forms, the balance of the abdominal pressure usually remains undisturbed, and fluids will find their way along the route offering the least resistance.

Operative treatment of pus accumulations in the pelvis during pregnancy is a matter of great importance. The danger involves two lives, and prompt intervention is demanded as soon as a diagnosis has been reached.

The recognition of a pelvic abscess, especially when the accumulation of pus is small, is not always an easy matter. An examination of the lower abdomen is very often unsatisfactory on account of the large size of the uterus. A distention usually present and causing no pain, should, under all circumstances, strengthen any suspicion that might be entertained as to the possibility of a deeply seated

abscess in the pelvis. The abdomen, on palpation, will not be found sufficiently rigid and tender to attribute this distention to peritonitis.

Palpation of the lower abdomen will, generally, disclose the iliac fossa free from a definite lump. However, there may be, in those cases where the uterus has ascended to a moderate degree into the abdomen (as in four- and five-month pregnancies), an obscure resistance above the pubes, formed by coils of intestine matted together above the abscess cavity. The percussion note over this obscure resistance gives a resonant sound, and deep percussion may elicit a tender spot over McBurney's point. Distentions of this character are generally caused mechanically by pressure of the abscess upon the rectum. As a consequence, the entire colon, and frequently the small intestine, becomes dilated.

Other valuable signs that aid in a diagnosis, are diarrhea of an intensely fetid odor, discharges of mucus from the rectum, rectal tenesmus, and often a feeling of discomfort in the lower part of the rectum. These conditions may exist either in a mild or a severe degree.

The most satisfactory and most convincing evidence as to the presence of pus in the Douglas' pouch can be obtained by a rectal examination. If the accumulation is considerable, no difficulty should be experienced in promptly detecting a fluctuating mass, even if the examining finger is inexperienced. However, when the collection of pus is small, the examining finger must not only possess a delicate sense of touch, the examination is made without the rubber glove, but it must have been educated so as to recognize and differentiate any abnormal conditions in the lower part of the rectum.

A collection of pus in Douglas' pouch will impart to the examining finger, as it is introduced into the rectum a distance of 3 to 4 inches, a tender mass of variable size. This mass is sometimes hard and sometimes fluctuating. The mucous membrane of the rectum in the immediate vicinity of the abscess will be found swollen, edematous, and covered with mucus. Furthermore, through the sense of touch, the flattening of the rectum against the sacrum can be recognized.

In the treatment of a pelvic abscess complicating pregnancy, two factors become absolutely axiomatic: First, prompt recognition of the pus collection; second, the simplest surgical measure for relief.

Let us consider for a moment the first requisite. Why the prompt recognition of the pus collection? Any infectious process terminating in suppuration is one of the greatest dangers to a pregnant woman.

On account of the continued high temperature, usually accompanying such a process, the life of the fetus becomes imperiled. According to statistics, a pus collection in the pelvis has caused abortion in 57 per cent. of cases, regardless of treatment. The abortions added 23 per cent. to the mortality of surgical intervention (Meyer).

Interruption of pregnancy may occur in three to five days after the pus formation has taken place. Advanced pregnancies are less tolerant of septic conditions than those of the early stages. Recently, I had occasion to observe a case that proved an exception.

A woman, in the sixth month of pregnancy, was taken with an attack of acute appendicitis. She was operated eight hours after the attack. It was a "clean case." However, the wound became infected. At time of operation, July 6, 1916, the temperature was 102°, pulse 124, R. 24. July 8, T. 103°, P. 132, R. 28. July 9, T. 104°, P. 130, R. 38. July 10, T. 104.4°, P. 132, R. 38. July 11, T. 101°, P. 124, R. 30. July 12, T. 100.2°, P. 112, R. 28. July 13, T. 98.8°, P. 104, R. 28. Labor pains from 12.05 P. M. to 12.45 P. M., at about five-minute intervals. July 14, T. 101.2°, P. 136, R. 36. July 15, T. 101°, P. 124, R. 32. July 16, T. 100.4°, P. 108, R. 28. July 17, normal. July 18, T. 102°, P. 106, R. 36. July 19, T. 103.4°, P. 104, R. 40. July 20, T. 101.2°, P. 98, R. 26. July 21, normal.

After that the temperature continued normal with slight variations. During the time of the high temperature, the movements of the fetus could be scarcely perceived by the mother. The heart sounds were heard with difficulty and sometimes not at all. This gave rise to fear of the death of the fetus. However, after the temperature had returned to normal, the movements of the fetus again became pronounced and the heart sounds could be auscultated with ease. In this case the fetus survived a high temperature, caused by a pus accumulation, covering a period of twelve days.

Now let us consider the second requisite: The simplest surgical measure for relief. First of all, let us bear in mind that although the abscess is not in itself the disease, it is nevertheless the factor of danger to the fetus, and must be urgently dealt with.

Surgery during the pregnant state must have its limitations, and these limitations must be more respected in the latter stage of gestation. An abdominal operation, for instance, can be performed with less risk of interrupting pregnancy before the fourth month than after this period of gestation. Furthermore, the thoroughness with which an operative measure, early in pregnancy, can be carried

out is fraught with less danger than in the later stages of this condition.

The paramount principle in any operative work, at any period of gestation, is the measure that offers the greatest safety to mother and fetus; be it for a pus accumulation or any other condition.

A rather perplexing problem confronts the surgeon in the treatment of a pelvic abscess complicating pregnancy. His judgment tells him that urgent evacuation of the pus is demanded. His judgment also tells him that it must be done expeditiously and with the least amount of surgical meddling. To him it remains problematical whether or not his patient is going to abort or miscarry. He must be, however, prepared for such an emergency and conduct his surgical attack accordingly. Where is the section to be made?

If the case is one in the earlier stages of pregnancy and the section has been made through the abdominal wall and that the element of luck favors the procedure, recovery without interruption of pregnancy may result. This happy termination takes place in about 60 per cent. of the cases. According to the statistics of Myer, abscess formation causes abortion in 57 per cent. of cases, regardless of treatment.

If the case is one in the later stages of pregnancy and an abdominal section is performed, the per cent. is less favorable. In these cases, an additional complication offers itself in the healing of the wound. Because of the constantly enlarging uterus, assuming that the patient has not miscarried, healing of the wound is considerably delayed; it may require from two to four months before the wound has fully and firmly closed. Should labor take place before the wound has firmly united, there is danger of hernia, or separation of the wound. If such a patient miscarries and lives, the wound will, of course, heal as under ordinary circumstances.

It has fallen to my lot to meet with two cases of pelvic abscess, in the sixth and seventh months of pregnancy, respectively. There was no difficulty in diagnosticating the pus accumulation in Douglas' pouch, both by vaginal and rectal examination. The constitutional disturbance was marked. Both patients had been sick a week, and the prospect of a miscarriage in each case seemed good. Although the fetal movements were no longer perceived by the mothers, the fetal heart sounds could be auscultated, thus giving assurance of life in either instance.

The method of surgical procedure seemed at first to be a serious problem. After some little time deliberations crystallized themselves into simple measures. The temptation to make an abdominal

section was lost when the complications that would inevitably follow such a measure at this period of pregnancy, were wholly realized.

A vaginal section, the logical procedure in the nonpregnant state, was dismissed because of the probability of a miscarriage. This is a hazard that must be reckoned with as the risk to the mother of a possible infection from the pus draining through the vaginal canal, in case miscarriage should follow vaginal section, would be very great. The only remaining avenue for consideration was the rectum, and it was into this viscus that the incision was made. Being certain of the pus accumulation in Douglas' pouch, it appeared to me to be the safer plan to drain through the rectum. The procedure proved very fortunate, both patients recovered without miscarriage.

It is of interest to cite some of the advantages of rectal drainage under these conditions. Assuming that a miscarriage had taken place, the danger of infection from pus could be readily controlled. Even had labor taken place before the abscess ceased to drain, the liability of infection from this source would be remote. The abdominal wall is intact and well able to fully coöperate during labor. There is no wound to give anxiety. In from two to three weeks the abscess usually ceases to drain and the patient is well established in convalescence.

Rectal section for drainage of a pelvic abscess is in itself a minor procedure. It is the feeling of uncertainty of finding the pus, or of injuring a viscus, that causes one to hesitate. Especially is this true when the pus accumulation is small and when no distinct fluctuation can be elicited. Much of this, however, rests with the experience of the surgeon; one may feel certain, while another may be in doubt as to the presence of pus.

There still exists a great reluctance to attacking a pelvic abscess through the rectum, presumably because of the likelihood of infecting the abscess cavity with fecal matter. This, however, may be considered as doubtful, inasmuch as this avenue is one of Nature's outlets to relieve the organism of pus accumulation in the pelvis. Patients relieved in this manner have usually suffered no untoward results, and their recoveries have been satisfactory.

In making a rectal section the anus is first gently dilated. The rectum is then well douched. The index-finger, without glove, searches for the most fluctuating spot in the tense mass; when found, a sharp-pointed bistoury is passed along the volar surface of the finger and cautiously introduced into the spot selected. As soon as pus is encountered, the bistoury is withdrawn and the point of

a dressing forceps introduced into the opening. By spreading its branches, a hole sufficiently large to admit the end of the index-finger is made. A large winged rubber tube is then passed into abscess cavity long enough for one end of it to protrude from the anus. This secures ample drainage and facilitates proper toilet. At the end of a week the tube is removed. The operation can be performed either without or with a superficial anesthetic.

REPORT OF A CASE OF RUPTURE OF THE UTERUS; SEPSIS; OPERATION; RECOVERY.

BY

RUFUS B. HALL, A. M., M. D.,

Cincinnati, Ohio.

RUPTURE of the uterus during labor is a rare and dangerous accident. Fortunately, it is so rare that only a very small per cent. of the men engaged in the practice of medicine ever see a case. The hemorrhage that occurs in rupture of the uterus, makes it a very fatal accident. Hemorrhage, however, is not the only danger in rupture of the uterus. This is demonstrated by the report of this case. The accident is of serious import, and it is worth while to report in detail every case. There will be no attempt made to review the literature of the subject, or to write a paper upon all its different phases. The writer will confine himself to the report of the facts observed, the condition found at the time of the operation, and the subsequent history of the case.

CASE.—Mrs. E., aged thirty, wife of a physician, Dry Ridge, Kentucky. The patient is the mother of three children, aged seven, three, and the third was born February 3, 1916, after a short, quick, unaided labor. There were no unusual symptoms after her delivery; in fact her husband, a physician, thought that she was fairly well until, in the afternoon of the fourth day, February 8, she had a slight chill. Her temperature, which heretofore fluctuated between 98.5 and 99° F., rapidly rose to 104°. The temperature subsided within two and one-half hours to 99°. After that the patient had, practically, a normal temperature every morning; between 2 P. M. and 4 P. M., the temperature varied, each day, from 101° to 102° until March 12.

During this period, the patient had a good appetite, felt well, had no chills or sweats, and had plenty of nourishment for her child. She complained because her doctor refused to let her get up; and expressed herself as feeling perfectly well, except for a slight pain or tenderness in the right lower half of the abdomen. This sensitiveness was always exaggerated in the afternoon during the rise in temperature.

The case was a puzzling one to her physician, a man of large experience in obstetrical work; he had never seen a case like it. The fact that there was no odor to the lochia or any other unusual condition, he felt reasonably certain that there could not be much wrong; still the case would not convalesce like other ordinary cases he had attended.

In the afternoon of March 12, five weeks and three days after delivery, without appreciable cause the patient had a severe chill, lasting nearly an hour. Immediately after the temperature rose to 103.5° F. I saw her the first time four hours after the chill. The temperature had then fallen to 101°. Patient's abdomen was moderately distended, not at all sensitive to palpation, except in the right lower quadrant. This region was quite sensitive to pressure. Muscular rigidity was moderate on that side; no mass could be felt in the abdomen or pelvis, except an enlarged subinvoluted uterus. The doctor assured me that there had not been anything unusual about the parturient tract since her delivery. Bimanual examination revealed that involution was progressing satisfactorily. There was nothing out of the usual to be found in the pelvis to account for the apparent sepsis. It did not seem to me the patient was suffering from puerperal sepsis. The cause of the infection was very problematical. Nor did it seem to be a case of appendicitis. The natural inference was that the patient had been the victim of a small ovarian cyst, which ruptured during labor, and nature was making an effort at cure by walling off the ruptured cyst. Still, a most careful examination did not reveal a mass of any kind. Therefore, I counseled delay and expectant treatment. The patient was in good physical condition, fairly comfortable and had plenty of nourishment for her baby.

The temperature rose each day to 101.5° to 102°, without chill, until the afternoon of the 16th, when the temperature went up to 103.5°. I was again asked to visit the patient. Notwithstanding the patient had been given an effective laxative each evening, the abdomen was fairly well distended. The uterus was as large as at my first visit, and not particularly tender. The pain and rigidity of the right half of the abdomen were more marked than before. Upon palpation I could outline an indistinct mass to the right of the uterus. This mass was not observed when I made my first examination. Six weeks had past since the patient's delivery. She was steadily growing worse. The mass in the right iliac region was probably pus. The patient was moved to the city March 20, thirty-five days after labor. On her arrival at the hospital her temperature was 102°. The following morning it had fallen to 98.6°. That afternoon, the temperature rose to 104°. The patient had a profuse sweat, and the mass in the abdomen appeared to be at least three times the size it was four days ago, and very much more sensitive to the touch. She had no longer any desire for food, and the pulse ranged from 90 to 110. She appeared septic; though she had still plenty of milk for the baby which continued to nurse.

On the afternoon of March 22, the abdomen was opened in the median line, under anesthesia. The omentum was found to be adherent to the abdominal wall and over the entire mass in the abdomen; it was also adherent to the fundus of the uterus. In separating the adhesions from the uterus, pus was found in front and to the right of the uterus. This abscess cavity held about 2 ounces of thick, yellow pus, and was carefully removed with gauze sponges.

It was now discovered that there had been a rupture of the uterus, at the fundus. The rupture extended down to the top of the bladder. In this rent the omentum has inserted itself and was firmly adherent to it. The uterus was larger on one side than on the other.

The omentum was severed, close to the uterus and all that portion of it in contact with the pus cavity, removed. The Fallopian tube on that side was not involved. The appendix was not involved. To protect the general peritoneal cavity, a strip of gauze was laid on the uterus over the site of the pus cavity and brought out through the lower end of the incision. A rubber drainage tube was left in the abdomen.

The patient rallied quickly from the anesthetic. How far the omentum extended into the uterus, whether it extended wholly or partially through the uterine wall, there was no means of determining. As nature had repaired the injury very satisfactorily, I considered it good surgery not to interfere with that organ at all. The infection was due to leakage from the uterine wound.

Studying the history of the case, we find that the first alarming symptoms were ushered in by the chill on February 8, at which time her temperature rose to 104°. The rapid subsidence of this high temperature, and the subsequent favorable progress of the case, does not indicate a streptococcic infection. One can thus readily see why the temperature and pulse and all the symptoms were of a milder character. It simulates somewhat the history of a ruptured appendix in which an abscess follows and is well walled off. One might infer that this form of unrecognized accident, plays an important rôle as a source of infection in some of the slow and tedious convalescences following labor. The writer is not in a position to prove this and does not wish to state that as a fact, but we all know that every obstetrician has had the experience of meeting cases of mild infection in which he is not able to trace its source; and this makes it worth while to consider this accident as a possible cause in such cases.

DISCUSSION.

Dr. Henry Schwarz, St. Louis, Missouri.—The case reported by Dr. Hall is indeed a remarkable one, and it was handled by him with consummate skill and good surgical judgment. As an obstetrician, I regret that he did not remove the uterus for the sake of having it examined as to the condition of its tissues. The case is very exceptional that a woman, who has a normal pelvis, who has given birth to three children without any difficulty, should have a rupture of the uterus at the time of labor. If she had a rupture, the presumption should have been that she had had removed from the uterine wall a fibroid, or that she had on a previous occasion, perhaps

for a pelvic tumor, a Cesarean section done upon her. At any rate, there should be some history to account for the cicatricial tissue or some weakening in the uterine wall. Without that history, and without the symptoms described in this case, it is not at all clear that we are dealing with the symptoms of a rupture of the uterus during delivery, and I would hesitate to accept Dr. Hall's case as one of rupture of the uterus having occurred at the time of delivery. I think it is a case that is altogether in a class by itself. Leaving aside cases in which the uterus ruptures after scar formation, a subject which will be discussed in papers to be read later in the session, rupture of the uterus is expected only when nature is hindered in her efforts to expel the fetus, when there is a disproportion between the parturient canal and the fetus. Under these circumstances it is good obstetrics either to do a Cesarean section for relative indications or to induce labor ahead of full-term. Of such cases I have seen only two, one before the time of doing Cesarean sections for relative indication in 1881. At that time we tried to induce labor in a case of minor pelvis. The nurses and junior assistants were sitting with the patient; labor was in full swing. The moaning of the patient was regular and kept me asleep in an adjoining room. But when everything was quiet in the delivery room I woke up and found the nurse and house resident asleep and the patient quiet. When there is a rupture of the uterus the patient becomes absolutely quiet. I ran into the delivery room and found that the child had escaped into the abdomen; I pulled it out by the feet, sent for my chief, who opened the abdomen, and closed the rent.

The second case occurred while I was delivering a lecture on obstetrics. A practitioner with whom I had had a number of cases of placenta previa, telephoned me in the morning that he had a case. I asked him if he had packed the case properly and he said he had. I told him that the patient could wait until I got through with my lecture. When I reached the house there was a rupture of the uterus. I found that the practitioner had given something which I did not advise, namely, a dose of Sharp and Dohme's ergotol, and the intense contractions caused the rupture of the uterus. The woman's vitality was very low and she died a few minutes after I had extracted the child, which had partially escaped into the abdomen.

DR. EDWARD J. ILL, Newark, New Jersey.—I disagree with my friend Dr. Hall as I do not think he had a rupture of the uterus in this case. Rupture of the uterus always occurs in the lower segment; it never occurs in the upper segment. Then he speaks of there being no blood in or about the abscess. There must have been some blood there if there had been a rupture, even if there was a secondary suppuration. Lastly, I have seen many cases of slow suppurative metritis following labor in which abscess occurred anterior to either horn and which, when opened and drained, was followed by recovery of the patient.

DR. J. HENRY CARSTENS, Detroit, Michigan.—Rupture of the uterus occurs usually in the manner Dr. Schwarz has mentioned. I am rather inclined to think that Dr. Hall's case was one of embolism

of the uterus, where, on account of degenerative changes, the part dies slowly of gangrene and finally tears.

DR. ARTHUR J. SKEEL, Cleveland, Ohio.—I am much interested in Dr. Hall's paper as it illustrates a case I had some time ago.

Rupture of the uterus must necessarily belong to one of two categories. First, those cases in which there is disproportion and after a prolonged labor a thinning out of the lower uterine segment with rupture in this location. In the other set of cases, through degeneration of the uterine muscle, rupture may occur early in labor and may take place anywhere in the body of the uterus.

The case I wish to report occurred in a woman who had in rapid succession ten children, with no difficulty. In the eleventh labor, after some two or three hours of pains, rupture occurred with the head in the pelvic cavity. The patient was taken to the hospital, the child removed with low forceps. The woman was in extremis. The abdominal cavity was opened, and rupture found without any thinning out of the lower segment of the uterus, as it occurs in those cases where labor has been going on for a long time. The rupture took place on the right side from the anterior portion of the uterine wall near the horn down toward the base of the broad ligament. There was no thinning out of the uterine wall at all. The rent was sutured, and after a somewhat tedious convalescence the woman recovered. This illustrates very clearly two types of cases, one due to obstruction in which necessarily rupture occurs in the lower uterine segment because of the thinning-out process due to a prolonged labor, and the other due to a degeneration of the uterine muscle in which rupture may originally occur almost anywhere in the body of the uterus.

DR. SYLVESTER J. GOODMAN, Columbus, Ohio.—Presupposing that this was a case of rupture of the uterus, and in view of the fact that this condition is somewhat rare, I wish to put on record two cases of rupture of the uterus which occurred in our service at the Grant Hospital in the last few months.

The first case occurred in the service of Dr. Drury in which a diagnosis was not made until a week after the rupture had taken place. Infection had occurred, with general peritonitis and pus everywhere. The abdomen was opened by the doctor who found a dead macerated fetus, which was removed, a hysterectomy made, abdominovaginal drainage instituted, and the woman made a good recovery.

The other was a case in which the diagnosis was promptly made and occurred in the service of Dr. Baldwin, operation having been performed by him. The diagnosis was made promptly by the attending physician, who had the patient brought to the hospital; a hysterectomy was done, abdominovaginal drainage instituted, and the patient made an uneventful recovery.

I cannot believe with Dr. Hall that we have many cases of rupture of the uterus that go unrecognized. Men connected with gynecological services would certainly use their efforts to determine previous ruptures if such were the case. We know how rarely we see a con-

dition of that kind, notwithstanding the fact that we operate on hundreds of cases. Personally, if I had had such a case I surely would have made a hysterectomy.

DR. O. H. ELBRECHT, St. Louis, Mo.—The case reported by Dr. Hall is so unusual that I feel with several of the previous speakers that it belongs in a class by itself. The thought occurred to me that this might have been either a bicornate uterus or a double uterus. If you recall the different types of bicornate uteri and the different types of double uteri, occasionally you will see one that is open and very thin, and there is a disproportion between one uterus and the other, one being parasite to the other, the tubes and ovaries being two in number only. There is a possibility of this case having been one of that type, inasmuch as it did not present any of the classical symptoms which we find in typical cases of rupture of the uterus.

It is to be regretted that Dr. Hall could not do a hysterectomy, as this would have cleared the pathological problem.

DR. HALL.—I have a live patient now, but she would have been dead if I had done a hysterectomy.

DR. ELBRECHT.—I refer only to the pathological side of it. I agree with you clinically and am sure you displayed excellent judgment in leaving it.

The pathological conditions, when you are in the belly, are so seriously distorted by the inflammatory products that you must guess at it and you did just what any of us would have done under similar circumstances. But the point is this: why should this case be in a class by itself and still be a rupture of the uterus, with so little disturbance that you chose to call it a normal delivery?

DR. JAMES E. DAVIS, Detroit, Michigan.—I wish to call attention to a condition that has not been mentioned in connection with this paper. Perhaps it might be considered in connection with Dr. Hall's case. Cullen some years ago reported upward of 150 cases of cysts occurring from the Wolffian duct remains between the anterior part of the uterus and the bladder. Last year I had such a case. The cyst had become infected, and in fact most of these cysts do become infected and are recognized following obstetrical deliveries. In my case the woman manifested a septic temperature, beginning on the fourth day which continued for eight weeks. When she came to operation, and an abdominal section was done, nothing was found to account for the conditions until I began to separate the bladder from the anterior portion of the uterus, then I opened into a cystic cavity which was infected, and which I diagnosed as belonging to this type of cysts. I wondered whether Dr. Hall's case might not have belonged to this class of infections?

DR. GEORGE VAN AMBER BROWN, Detroit, Michigan.—Four years ago I had a case of rupture of the uterus, a recital of which may be helpful in arriving at the cause of this trouble. The woman had previously borne two children. This was her third pregnancy. She had a normal delivery. A few hours after her delivery her physician was called, and as they could not get him, they called in a neigh-

boring physician, and we do not know at that time what he did except the vagina had been packed. The woman was taken to the hospital; she remained there for ten or twelve days, apparently was doing very well, and then went to her home. She had been home only a day, was up and about, when profuse hemorrhages came on again. She was again taken to the hospital; I was out of the city at the time but was called a few days later to see her in the fourth week after her delivery. She had no chills, nor rise in temperature; the only symptom was that of bleeding. At the time I saw her anemia was very pronounced; she had shortness of breath; her legs were edematous; her labia were like two great sacs holding water. Her hemoglobin was so low that we could not make an estimate of it. It showed 20. The blood count was 1,435,000. We took her to the operating room; we did not dare give her a general anesthetic. We put her in the Trendelenberg position, opened the abdomen under novocain, and found the omentum which had just closed in over and was appearing at the fundus; we pulled that away, and found there was a cavity where the blood was arrested. The edges of the wound had shown no signs of healing whatever, but were very much narrowed down. Involution had gone on very well. The woman made a nice recovery.

In getting hold of the young physician who had been called in at the time of the first hemorrhage, it was found that he had packed the uterus as well as the vagina. Evidently that was the cause of the rupture and it did not occur at the time we supposed it did.

DR. E. GUSTAV ZINKE, Cincinnati, Ohio.—The case reported by Dr. Hall is, certainly very interesting and deserves consideration. The history of the case was not quite clear to me. Will Dr. Hall kindly state the nature of the case. Did she have an instrumental delivery, a version or any other obstetric intervention?

DR. HALL.—It was not an instrumental delivery. I did not go into the other details. The patient was a doctor's wife, delivered her after a short and uneventful labor. She had a few effective pains only. She lost consciousness for five or ten minutes; her husband thought she had fainted. The patient was a highly nervous woman, and did not recover consciousness for four or five hours.

DR. SCHWARZ.—When was the placenta removed?

DR. HALL.—The practitioner removed the placenta from below.

DR. ZINKE (resuming).—She had then a spontaneous labor and the doctor only assisted in the delivery of the placenta?

DR. HALL.—Yes.

DR. ZINKE.—There is no history of injury to the uterus, and if a rupture did take place it was, probably, spontaneous and due to some diseased or abnormal condition in the uterine wall. Now, what is it that can disturb the uterine wall and result in a rupture of the uterus during delivery? None of the conditions that might be responsible for the accident have been mentioned except one. Is it not possible that this placenta in some small part had undergone chorionic epitheliomatous degeneration and that the portion

involved had destroyed the uterine musculature in that region. We can never tell when these malignant changes develop. They may begin at any period of gestation. At the time of labor the placenta had perforated the uterine wall. Infection may have resulted in an abscess which broke through the peritoneum, and caused adhesion between uterus and omentum. In this way we can, in a manner at least, explain the conditions described by Dr. Hall. This is about the only explanation I have to offer. It was not a rupture which occurred during the labor; nor was labor itself responsible for it. Evidently the perforation occurred some-time after the birth of the child. The case is explicable only when placed on the basis of a pathological condition.

DR. CHARLES L. BONIFIELD, Cincinnati, Ohio.—I quite agree with Dr. Zinke that this case must have been one of perforation rather than a rupture of the uterus, and the contribution I have to make on the theory of how perforation occurs is this: the observation that I am going to make and tell you about was on a dog instead of a human being, but I think it may have some bearing on this case.

A year or two ago I had a French bull bitch which against my wishes became pregnant, and after she had been pregnant for some weeks some one stole her and she was gone four or five days. Finally, one Sunday, when I got home my bitch was there and showed great evidences of abuse. She evidently had been tied up as there were scratches all over her. I wanted to keep this bitch and did not want any puppies. The next time I went out of town a professional friend of mine did a hysterectomy on her. He reported to me this very unusual condition, that in one side of the uterus there were three perforations. The dog was quite sick. These perforations were round and covered by omentum. My idea is that the dog was kicked in the belly or had received some violence which set up a thrombosis in the uterus and it went on to perforation. It was necessary to do a panhysterectomy and the dog recovered from the operation. It seems to me, this case may have some bearing on the case cited by Dr. Hall. This woman might have sustained some injury to the uterus through the abdominal wall which may have caused a limited thrombosis.

DR. HALL (closing).—I did not expect very many obstetricians to agree with my diagnosis in this case of rupture of the uterus. I have opened a great many abdomens, and the old story that he who laughs last laughs best holds good in this case. There would not have been a question in your mind if you could have seen the uterus at the time of the operation as to whether there had been thrombosis with incarceration of the omentum or a rupture of the uterus. I am willing to accept the end result that the patient recovered on the theory that she had a rupture of the uterus. That may be all wrong, and I am perfectly willing to stand corrected if it is. For the sake of argument, let us admit it was a thrombosis. It looked as though the uterus was split in two and the omentum dropped in and was carried into that organ, and some of the dirt, walled off, as the cause of the abscess. That is only theory on my part. It

was the most reasonable thing to me, yet it may have been a thrombosis, with breaking down later and the omentum being caught in the uterus. The omentum was not plastered on to the uterus, but it was incarcerated in the uterine wall. I first examined on one side to detach it, and then on the other.

The less surgery we do on a patient who is profoundly septic the better the end results. I think the explanation of Dr. Davis would be more rational than the theory of thrombosis of the uterus, namely, an abnormal cystic development in the uterus which caused a weak point. After all, it is largely theoretical. It may be she did not have a rupture of the uterus, but a case of secondary infection from a thrombosis.

In regard to the question of Dr. Schwarz as to whether the husband introduced his hand into the uterus, I will say that the husband said he had no difficulty in removing the placenta. That is about the only question I asked him. Rupture of the uterus never entered my mind as a causative factor until the time of the operation. In short, rupture of the uterus was not discussed before operation.

DR. ELBRECHT.—How about perforation before she became pregnant?

DR. HALL.—I do not think she had a perforation before she became pregnant. She was the wife of a physician and very anxious to have a child. Everything was lovely so far as their domestic relations were concerned.

DR. PANTZER.—Had she ever been curetted?

DR. HALL.—No, she had not.

RUPTURE OF THE UTERUS IN CESAREANIZED WOMEN, WITH A REVIEW OF THE LITERATURE ON THIS SUBJECT TO DATE.

BY

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Detroit, Mich.

A CASE of this character, occurring in my practice recently, led me to inquire into the frequency and causative factors of this accident. From the literature available in the library of the Wayne County Medical Society and the Medical Library of the University of Michigan, I have been able to find seventy-eight cases recorded, my own case making seventy-nine. This includes the sixty-three cases tabulated in the very exhaustive paper on this subject, in the American Journal of Obstetrics, by our esteemed Fellow, Dr. Palmer Findley. In order to have as much as possible of the literature on the subject available in one place, I have compiled a review of forty-two cases more or less in detail, which I would be pleased to furnish on request.

In endeavoring to determine the frequency of this accident, we find that sixteen of these cases occurred prior to the year 1900 and twenty-six since that time. Considering, therefore, the number of abdominal Cesarean sections that have been done all over the world, especially in the last decade, we may safely conclude that this accident is comparatively rare; that its rarity speaks well for the improvement in technic in the operation in recent years; and that the possibility of rupture in subsequent pregnancies should not, we think, be considered as a contraindication where the operation is clearly advisable.

Suture Material Used.—In seventeen cases catgut was used, in two silk, in one silk and catgut. In the remaining twenty-two cases, the kind of suture material (when such was used) is not mentioned. In many of the earlier cases reported, the uterus was not sutured, the abdominal incision being closed with a few sutures, presumably silk.

Mortality.—Twenty-seven of the mothers recovered, while only four of the babes were born alive, giving us a mortality of 60 per cent.

and 90 per cent. respectively. Twins were present in one of the cases. The high infant mortality is, undoubtedly, due to the loss of blood incident to the rupture, delay in operating, and prematurity of birth.

Etiology.—When we consider the causative factors in the production of this accident, we can, with a reasonable degree of certainty, conclude that the uterine wall at the site of the scar was defective. This is shown by a review of the cases reported; rupture invariably occurred at that point. Undue tension may be produced by a large fetus, pregnancy or hydramnios.

The most important factor, however, is the condition of the scar in the uterine wall. In but few if the cases reported have microscopic examinations of the ruptured scar edges been made; and this, I confess, was neglected in my own case. Considerable light is thrown on this phase of the subject by the microscopic findings in the case reported by Cocq.

In the case reported by Breitenbach the microscopic findings would seem to indicate that the placenta had been attached to the scar area; in two of the three cases reported by Wall and Shaw this same condition was found.

Further evidence that the faulty scar is the principal cause in the production of rupture, is found especially in the cases reported by Sommer, Convelair, Locher, Brunnings and myself. There can be little doubt that infection following the operation predisposes to rupture in subsequent pregnancies; attachment of the placenta over the site of the scar has a tendency to render the uterine wall more soft, easy of distention and hence more liable to rupture at that point. This latter is further verified by Palmer Findley in his recent article on the subject. He found that in eighteen out of twenty ruptured uteri, the placenta was attached to the scar area.

It is interesting to note that the great majority of the ruptures occurred during the pregnancy following the section and the sooner the pregnancy occurred after the operation the greater the liability to rupture.

It would seem also, from a review of the literature, that the rupture takes place in the vast majority of cases *in* the scar and not in the musculature near it. An exception to this is noted in the cases of Davis reported by Harrar, who says that microscopic examination showed the rupture to have taken place in apparently healthy muscle tissue, but between two old section scars.

It has occurred to the writer that, in the cases where chromic catgut is used, a faulty scar may result even where no infection existed,

because of the destruction of more or less muscular tissue by the formation, around the sutures, of small canals containing a serosanguinous fluid, such as is sometimes observed in the abdominal wall. It is very probable that the intermittent contraction of the uterus, during the first thirty-six hours postpartum, also tends to interfere with a proper healing of the incision. Especially would this seem to be true when we consider the irregular course of the muscle fibers in the uterus. Healing may also be more or less retarded because of the impoverished condition of the blood consequent upon severe hemorrhages. My own case was as follows:

March 19, 1914, Mrs. K; aged twenty-seven; primipara; justominor pelvis; membranes had ruptured before entering the hospital.

Thirty-six hours after admission convulsions developed. Patient was promptly anesthetized and delivered by abdominal Cesarean section. The convulsive seizures recurred postpartum and venesection was twice resorted to, 1400 c.c. being removed the first time, and 1200 c.c. seven hours later.

The third day after labor she developed a temperature; this continued for almost two weeks, fluctuating between 100.2° and 103.8° F., but, eventually, she made a good recovery.

On October 16, 1915, when within about three weeks of term with her second pregnancy, she was seized suddenly with severe pain in the abdomen about 12 noon. Rest in bed and some household remedies administered for the pain, did not improve her condition, and I was called at 1:30 P. M.

Upon my arrival at the house her condition was one of shock, apparently due to internal hemorrhage, although her pulse was still of fairly good quality. The ambulance was ordered. I went to the hospital to prepare for operation. When the ambulance arrived at the patient's house, she had improved so much that the husband would not allow her to be taken to the hospital. Here valuable time was lost. It was 4 P. M. before the operation was performed.

On opening the abdomen, the placenta and dead child were found among the intestines and promptly removed. A few dark clots, but very little fresh blood, was found. The uterus had ruptured through the Cesarean uterine scar and contracted firmly so that there was, practically, no bleeding.

Supravaginal hysterectomy was performed, and we looked for a prompt recovery; but the patient did not rally well from the operation and died at 9:15 that night.

On subsequent examination of the uterus, I was surprised at the thickness of the uterine wall where the rupture had occurred. This is, I think, explained by the microscopic and macroscopic findings in Cocq's case to which reference has been made to. As the placenta was lying completely in the abdominal cavity, I am inclined to believe it had been attached to the scar area.

From the foregoing evidence, it would seem that, if any improve-

ment in our method of closing the uterus is to be made, it should be in the more careful closure of the uterine incision. We should always endeavor to secure a perfect approximation of the uterine musculature without including the mucosa. It has long been understood that care must be exercised in closing the uterine incision, the mucosa should never be included in the sutures because, in a subsequent pregnancy, islands of the mucosa may be transformed into decidual tissue and thus weaken the uterine wall. This we consider an excellent point.

The ten-day chromic catgut, number 3 is, we think, the best material and size for the deep sutures. Plain catgut may absorb more readily and cause less weakening of the walls through formation of canaliculi.

CONCLUSIONS.

1. A Cesareanized woman is always in danger of rupture of the uterus in subsequent pregnancies and should, therefore, be under careful observation during the latter months of the period of gestation.

2. If the puerperium following the first Cesarean section was afebrile, the patient may be permitted to go to term with the next child provided she can spend the last month of gestation in the hospital; if not, labor should be anticipiated at least two weeks prior to term.

3. Implantation of the placenta over the scar area, undoubtedly, increases the danger of rupture of the uterus in a subsequent pregnancy; the same may be said of a febrile puerperium following hysterotomy.

In closing, I wish to acknowledge the valuable assistance given me by Dr. C. V. Weller in reviewing the literature.

RUPTURE OF THE CESAREAN SCAR.

BY

A. J. RONGY, M. D., F. A. C. S.

New York.

THE introduction of asepsis and antisepsis in the practice of surgery and the application of these principles to obstetric surgery created a new problem for the obstetrician.

The abdominal method of delivery, once a rare and most feared operation, was very soon applied not only in cases in which absolute contraction of the pelvis existed when the delivery of a viable child was impossible, but also in cases of relative disproportion of fetal head to the pelvis.

Of late Cesarean section is being adopted as the safest method of delivery for the mother in some forms of placenta previa and eclampsia. The operation, which originally was almost always performed in the interest of the child, is now extended to many cases where it is thought the interest of the mother is best conserved.

This broader application of the operation created a new problem in obstetrics, "the care of the Cesareanized woman during subsequent pregnancies." Every obstetrician is confronted with this problem. He must definitely decide as to the proper procedure in such cases. A thorough perusal of the literature discloses the fact that very little thought has been given to this most interesting condition, and that the subject has been hardly investigated. We, therefore, lack the necessary experience upon which to base our opinions and conclusions. The delivery of a child by the abdominal route is now estimated to take place in about one out of two hundred pregnancies. If this is true, we can readily realize the magnitude of this question and how important this discussion is. This problem must not only be approached from its surgical aspect, but also from the standpoint of the patient.

In metropolitan districts the interest of these patients is, to a certain extent, safeguarded by virtue of the fact that competent help is within very easy reach; however, very many of these women are so

situated that proper surgical aid cannot promptly be rendered should a complication arise during pregnancy or labor. How shall we conserve the interest of such patients?

Shall we, when advising a patient to undergo a Cesarean section, discuss the immediate results of the operation only? Or are we to enter into the question of subsequent pregnancies and their management? I believe the patient has the inherent right to be made acquainted with all the facts, present and future, connected with this operation.

What shall be the attitude of the obstetrician? Shall he treat the case in accordance with present indications and entirely eliminate the question of subsequent pregnancies from consideration, or shall he put forth the dictum "once a Cesarean, always a Cesarean?" It is this thought in my mind that prompted me to bring this question to your attention. I earnestly hope that your discussion will help to settle this difficult and most recent obstetrical problem.

As far back as 1886 Krukenberg saw fit to undertake an exhaustive study of rupture of the Cesarean scar. He collected twenty cases from the literature which showed a mortality of 50 per cent. He believed two factors to be responsible for the rupture of the scar: First, the natural weakness of the cicatrix in the uterus. Second, invasion of the musculature of the uterus by foci of decidual cells. He believed that if silk were used in suturing the uterine wound, rupture would seldom, if ever, occur. This contention was soon disproved for, in the cases of Wager and Everke, rupture occurred notwithstanding the silk sutures.

Recently N. R. Mason and J. I. Williams investigated the strength of the Cesarean scar by animal experimentation in guinea-pigs and cats. They tested the comparative strength of the muscle and scar of the uterus by applying weights to a section of the uterine wall containing the scar. They found that in each instance the muscle gave way first. In one case only had the rupture extended into and along the scar. In another it passed through the scar at right angle to it. Two animals were again pregnant and near term when the tests were made with the same results. They thus ruled out any change in the strength of the scar during pregnancy and concluded that a firmly united scar is even stronger than the uterine muscle.

Harrar cites forty-two cases in which repeated section was performed, and the previous scar was either not discernible or was solid with no apparent thinning or stretching. He further states that in sixteen out of forty-two cases there were adhesions of the omentum either to the uterus or to the anterior abdominal wall. He

maintains that these adhesions did not seem to affect the uterine cicatrix.

Personal experience, based on observation of the uterine scar during the performance of repeated section, compels me to differ from the above conclusions. It is hardly possible to maintain that a scar in any part of the body, even if its healing processes were normal, possesses the same strength and vitality as normal tissue. Healing by first intention has its definite inflammatory reaction and, therefore, no scar can possess the same anatomical and physiological characteristics as normal uninjured tissue. Its nutritive powers must be lessened. It is subject to many local disturbances. Its natural life is shorter, as is evidenced by the thinning out of many cicatrices in the abdominal wall of wounds that healed by first intention. The healing process of a uterine wound is unlike that of any other surgical wound in the body. There are many factors which interfere with perfect union; the intermittent contraction of the uterus, and the retained secretion in the uterine cavity tend to disturb the union of the wound. During a subsequent pregnancy the normal growth of the uterus, the waves of contractions which constantly take place during the latter months of pregnancy, and the not infrequent implantation of the placenta, wholly or partly, in the scar area and the trophic changes of the uterus, all cause alteration in the scar tissue, thereby lessening its resistance to any undue strain either during pregnancy or labor. Assuming that the experiments of Mason and Williams are clinically true of all the cicatrices which result from primary union, I scarcely believe that the authors would maintain that cicatrices, the healing process of which is disturbed by infection, possess the same strength. Clinically, there are evidences of infection in and about the uterine scar in at least one-third of patients who are operated for repeated section. This fact is very plainly demonstrated by the signs of degeneration in the scar structure and omental adhesions in and about the cicatrix observed during subsequent operation. Unfortunately, we have no means at our disposal by which we are able to diagnosticate the actual changes which take place in the uterine wound. The infection is very often so insidious and mild that it causes very little, if any, constitutional disturbances. Nevertheless, the local changes in the wound do interfere with the normal regenerative processes.

The laws governing the formation of the Cesarean scar differ in all their essentials from all other scar formation; therefore, in order to safeguard the interest of the woman who has had a Cesarean section performed, we must definitely decide what method of treatment

shall be pursued in the event of subsequent pregnancy. The conclusions of early writers like Lucas Championniere, Sänger, and Leopold, that the strength of the scar depends entirely upon the degree of asepsis and antisepsis practiced, on the use of proper suturing material, and the careful approximation of the united ends cannot, in the light of our present knowledge, be accepted as the only causes for scar weakness and subsequent rupture. Recently cases of rupture were reported from some of the best and most modern clinics, both here and abroad. The technic followed is practically the same in all cases, yet rupture will very often occur before labor actually sets in.

Louis Singer (Paris, Thesis, 1908–09, No. 449) undertook to investigate the frequency of rupture of the Cesarean scar. He made an exhaustive study of the literature and also communicated with the surgeons in charge of the cases. His report is based on 155 published and 98 unpublished cases, or 253 women who had 290 gestations and were delivered by section. In this series rupture of the scar occurred in twenty-one cases. He states that this unusually large per cent. of rupture was due to the improper technic of the earlier operators. He, therefore, continued his investigations to more recent times and collected ninety-eight cases who had 113 gestations, and who were delivered by Cesarean section with no subsequent disturbance of the scar.

Judging from various reports, most authors agree that rupture of the scar occurs in about 3 per cent. of cases, and that the mortality in such cases is over 50 per cent., no matter how promptly treatment is instituted. Therefore, nearly 2 per cent. of women who have had a Cesarean section performed, ultimately perish as a result of the operation.

This accident is entirely dismissed from consideration in the various mortality records of the Cesarean operation. In order to have such records complete, the indirect mortality, such as is caused by secondary rupture and the rarer complication of bowel obstruction, must also be included.

We all realize that the primary mortality from Cesarean section is still high, that the mortality would be greatly reduced if it were possible to operate on all cases before exhaustion and infection have already set in. It is the lack of diagnostic ability that increases the mortality in all surgical operations; particularly is this true in obstetrics. Elective surgery now has a very small mortality. There is no reason why we should not educate ourselves, as well as the profession at large, whereby a proper diagnosis can be made early

enough to make the surgical procedure one of election, and not of emergency, as is unfortunately the case in the greatest per cent. of cases. The mortality of elective Cesarean section is at present only about 3 per cent. Rupture of the Cesarean scar occurs, at least, in about 3 per cent. of cases. Theoretically, it would appear that it should be logical to conclude that the dictum, "Once a Cesarean, always a Cesarean," is correct and should be accepted as the standard of practice. The patient who once has an abdominal section is more careful about her condition and, owing to her previous experience, she usually places herself in the care of a competent surgeon. She is watched carefully. She does not question the advice given to her as to the management of her condition. In that way she gains all the benefits which modern obstetrics offers, so that the mortality in repeated elective Cesarean section is practically reduced to a minimum.

I believe that in the very near future it will be proven that the mortality of cases of repeated Cesarean section will hardly compare with the mortality of cases of primary Cesarean section. However, at present these cases are still too few to permit of final deductions.

No matter how correct our decision may be from a theoretical consideration of the subject, or how sound our advice may be from a purely statistical analysis of the condition confronting us, we cannot always carry it out in actual practice. Various circumstances arise which compel us to modify our opinions. Very often we are in doubt as to the proper procedure in a given case. This is particularly true in cases in which labor appears to progress favorably and is expected to be of short duration. To this group of cases belong all patients who have had Cesarean section performed for conditions other than mechanical obstruction due to disproportion between the fetal head and pelvis, as cases of placenta previa, eclampsia and those who have had hysterotomy performed for tumors or adherent placenta. This class of patients reject any suggestion on the part of the obstetrician for any abdominal operation. They think their present labor different and one which to their minds apparently presents no complication. They, unlike the patients who have had dystocia, due to disproportion between the fetal head and pelvis, have experienced no pain during the birth of the previous child and are, therefore, not convinced of the necessity of interference. They as well as the other members of the family have a decided preference for allowing labor to take its natural course. Such patients really tax the ingenuity and the resources of the obstetrician. He is thus compelled in practice to deliver a number of

Cesareanized women by conservative methods not infrequently with disastrous results to both mother and child.

A certain amount of study and investigation has been accorded to rupture of the Cesarean scar during labor and we, therefore, have been taught to watch these patients while labor is progressing. The scar should be carefully watched for any thinning by often repeated abdominal palpation. These patients should not be permitted to pass through a stormy and prolonged labor. Interference should be instituted as soon as any signs or symptoms of impending rupture manifest themselves.

Spontaneous rupture of the scar during pregnancy, especially during the last two months, occurs more frequently than is generally supposed and, therefore, a woman who has been delivered by Cesarean section should be under strict observation during the latter half of the pregnancy. At times, thinning of the scar may be detected early, so that a proper measures to prevent rupture may be applied.

My experience consists of two cases of spontaneous rupture of the uterine scar during pregnancy, and one of threatened rupture during labor.

CASE I.—F. L., patient of Dr. S. J. Scadron, aged twenty-two, para-ii. First child delivered by Cesarean section in one of our large hospitals. Postpartum period normal, remained in hospital eighteen days. Pregnant again January 11, 1913. Was due September 20. Was carefully watched by Dr. Scadron. She was told that induction of labor might be considered about the thirty-sixth week. On July 24 the doctor was summoned to see her. On arrival he found the patient in shock. He made a tentative diagnosis of internal concealed hemorrhage and sent her to the Jewish Maternity Hospital. On admission, it became evident that the fetus was in the free abdominal cavity. She was immediately prepared for operation. On opening the abdomen the fetus was found to have escaped from the uterus through the old scar which gave way entirely. The placenta was in the opening, partly in the uterus, and partly in the abdomen. The patient was in severe shock. Suturing of the rupture was substituted for the more radical operation of hysterectomy. The patient died on the fourth day from septic peritonitis.

CASE II.—Mrs. R. W., aged twenty-eight, para-ii. First baby delivered by Cesarean section performed by Dr. Scadron two years ago. Became pregnant again one year later. July 11, 1916, about 3 A.M., the doctor was summoned to see her, because she did not feel well. On examination the abdomen was found to be distended, very tender and sensitive. The patient presented all the symptoms of shock. The diagnosis of rupture of the uterus was made by Dr. Scadron, who asked me to see the patient with him. The diagnosis was unquestionably correct, and she was taken to the Lebanon

Hospital for immediate operation. On opening the abdomen the placenta was presenting through the opening of the ruptured scar. The placenta and dead fetus were delivered through the opening and the uterus amputated at the internal os. The patient rallied and made an uneventful recovery. She was discharged at the end of sixteen days.

CASE III.—A. S., para-iii. First labor instrumental; baby still-born. Two year later she was delivered by Cesarean section by a well-known obstetrician. Sept. 12, 1913, she was admitted to the Jewish Maternity Hospital in labor. On examination the cervix

FIG 1.—Rupture of uterine scar.

was found dilated admitting two fingers, patient having strong pains every six to seven minutes. Membranes intact; abdominal palpation disclosed a deep notch in the anterior surface of the uterus corresponding to the line of the Cesarean scar. The findings were telephoned to me. I ordered immediate preparation for operation. My associate, Dr. S. J. Scadron, who arrived at the hospital first, fearing that rupture of the uterus was imminent, put the patient under light anesthesia during the preparation of the operating room. On opening the abdomen the uterine scar was found thinned out as if ready to rupture. The entire scar consisted of the peritoneal covering of the uterus and some strands of tissue underneath it. The uterus was incised through the old scar, which was resected completely. The wound was closed in the usual manner. Patient was discharged from the hospital on seventeenth day.

CONCLUSIONS.

1. Spontaneous rupture of the Cesarean scar occurs in about 3 per cent. of cases. In most instances rupture takes place during labor. It does take place not infrequently during the latter half of pregnancy, especially in the last six weeks.

2. We have no means by which we can judge the strength of the scar. Rupture will occur in cases which run an afebrile course and in which union of the wound is apparently by first intention.

3. One-third of all patients who undergo subsequent Cesarean section show evidence of inflammatory reaction in and about the uterine wound. The result in such cases is a weakened scar.

4. Proper suturing of the uterine wound and exact approximation of the edges will not always prevent subsequent rupture of the scar.

5. The mortality rate of repeated section is smaller than that of primary Cesarean section, because these patients are more carefully watched.

6. A patient who has once had a Cesarean section should not be allowed to go through a tedious or severe labor. If labor does not progress rapidly, Cesarean section should be performed.

7. When advising a patient to have a Cesarean section, the management of subsequent pregnancies should be taken into consideration and discussed with one of the members of the family.

8. As a general rule, it may be stated that fully 75 per cent. of women who have had a Cesarean section are delivered by repeated section during their subsequent labors.

9. The obstetrician should always bear in mind that Cesarean section creates a new problem for the woman, and therefore he should carefully weigh the indications before he decides upon the abdominal route. He should remember that the dictum, "Once a Cesarean, always a Cesarean," holds true in fully 75 per cent. of cases.

Finally, it is my firm belief that Cesarean section is very frequently resorted to in cases which should be delivered by other methods. Abdominal section is a major obstetrical operation. Surgeons and gynecologists, who have no obstetrical knowledge, are not competent to make a proper diagnosis and should not perform it. Obstetrics, in order to gain the respect of both the community and the medical profession, should be practised only by those who have had a proper training. The interest of the pregnant woman will then be properly safeguarded.

DISCUSSION OF PAPERS BY DRS. BELL AND RONGY.

DR. PALMER FINDLEY, Omaha.—We have had two very interesting and instructive papers on a subject which has interested me very much of late. My interest in the subject was awakened by a case which I saw in the Charité Hospital of Berlin shortly before the war began.

A woman, twenty-three years of age, who had been Cesareanized eighteen months before for a contracted pelvis was pregnant in the seventh month of gestation and was losing a moderate amount of blood from a marginal placenta previa. She bore a wide abdominal scar which suggested probable infection following the Cesarean section. Prof. Franz, in charge of the clinic, directed that a bag should be inserted into the cervix and after dilatation of the cervix by the bag, that the head of the child should be perforated and the child extracted. The bag was inserted, pituitrin was administered and with the second pain the patient went into collapse. The abdomen was opened within twenty minutes and the uterus removed. There was found a complete rupture of the uterus and a dead fetus within the free peritoneal cavity. The patient died in collapse two hours later.

The following day Prof. Franz commented upon the case in his clinic and said, that henceforth he would always make his incisions high in the body of the uterus where the musculature is best developed and he would advise a Cesarean section on every pregnant woman who bore a Cesarean scar. Not long after this experience in Berlin, I had observations in three cases in Glasgow which called for a similar expression from Prof. Jardine and Prof. Cameron.

I found much the same sentiment in England and in the United States and I was inclined to adopt the slogan—"Once a Cesarean, always a Cesarean." However, a careful review of the literature has convinced me of the unreasonableness of such a conclusion.

I fail to agree with Dr. Rongy in his conclusions. I do not think any 3 per cent. should lead us to adopt a general course of action. I would rather be guided by the other 97 per cent. If as Dr. Rongy says, only 3 per cent. rupture in subsequent pregnancies would it not be more rational to persue the policy of watchful wating; to place all such cases in the hospital and allow them to deliver themselves if this can be done without serious embarrassment. If, on the other hand, there is a history of the patient having run a fever course after her previous section, or if there exists an evident cause for prolonged and difficult labor, such as a contracted pelvis, a malposition of the fetus or delayed labor from any cause whatsoever, then proceed with Cesarean section.

I would not favor high forceps, version, pituitrin or hydrostatic bags in the presence of a Cesarean scar. The uterine scar is always an unknown factor and as such we must avoid undue strain upon it. I would therefore conclude that once a Cesarean section always a hospital case in event of a subsequent labor.

Dr. J. HENRY CARSTENS, Detroit, Michigan.—As I see it, this question is a rather difficult one to solve, and I agree in the main with what Dr. Findley has said. I do not know how many cases I have had, but I should say fifteen where I have performed Cesarean section a second time, and in one or two instances I have performed it a third and more times on the same patients. I have asked practitioners to see whether they could find the scar of the previous operation in the uterus, and not a single one has been able to do so. Not one was able to find where the scar was, so that there was good union throughout. In all these cases, however, there was a pelvic deformity. Whenever these women have a pelvic deformity they all require a second Cesarean section. There was not one of these women that required a second operation who was operated for a placenta previa or eclampsia.

I make it a point to have these patients go to the hospital early, and, if possible, I operate on them two weeks before the expected time of labor. Sometimes they would neglect going to the hospital as requested, and I would see them after they had been in labor ten or twelve hours. I consider I have been very lucky in not having a rupture of the uterus in any of them.

There is a great deal in the way in which we sew up the wound. Some practitioners have a rather slip-shod way of doing this. In sewing up the uterine wound I am very particular not to include in my ligature any of the mucous membrane. I take plain ordinary catgut, not chromicized or anything else, that will be absorbed quickly, and I take a big bite through the uterine muscle up to the mucous membrane, and then on the other side just above the mucous membrane, making a running suture and bringing it together not too tightly.

I think a great deal of trouble which arises in these cases is due to the sutures being *tied too tightly* and hence they strangulate the tissues. It is these minor points that make the difference between success and nonsuccess in these cases. By running the suture right up it stops all hemorrhage and I am enabled to bring the muscular walls together, and then I run back the other way, running the same suture back to where I started and tie it. While I am doing the latter I make a kind of secondary Lembert suture. I make it a point to have the serous membrane lightly pressed in so that it comes absolutely together.

I agree with Dr. Findley that these cases ought to be watched, at least, even though they may not need an operation. I do not think one needs to fear rupture of the uterus in many of these cases. However, to be on the safe side, it is better to watch them in case operation should be needed.

Again, these women should be told something about future pregnancy. I regard this as an important point. A great many women will say to us, "I do not want any more children; I want one." But these women do not know whether that child is going to live or not; they do not know but what it will die, and what then? She may want a child in the future, and if you sterilize her in the

meantime so that she cannot become pregnant again she may worry a good deal over it. If a woman has had one or two children, I would not have any compunctions of conscience about sterilizing her, but if she has no children, or has only one child, and that child may die then I will not sterilize her for the reason that some twenty-five years ago I operated on a woman on whom I did a Porro-Cesarean section, which was the operation we did in those days, and she told me she wanted it done. Six months or two years afterward, when I met that woman, she cried and exclaimed, "Doctor, if I only knew as much as I do now I would not have allowed you to remove my uterus." So when I think of that poor woman, I hesitate twice now before sterilizing a woman who has no children.

DR. HENRY SCHWARZ, St. Louis, Missouri.—I wish to endorse every word that Dr. Findley has said. He expresses my standpoint exactly.

I wish to relate briefly two cases I have delivered within the last year through the natural passages. One was a woman on whom Dr. Webster, of Chicago, had done a Cesarean section some years before on account of obstruction to delivery by an ovarian tumor.

In the other case I did a Cesarean section three years ago. The woman was brought into the hospital with a temperature of 104°; she was very sapremic, with an offensive discharge from the uterus. There was a dead fetus in the uterus, which was macerated. We took it out. She was a young woman, and it was her first pregnancy. After emptying the uterus and removing a subserous fibroid coming out on the left side of the uterus close to the external os and plugging the pelvis, and also after removing a smaller fibroid near the fundus, I closed the uterus because the woman was young and had had no children. I delivered this woman about seven months ago through the natural passages. In both cases I used scopolamin and narcophin during the first stage, and delivered the women just as soon as the first stage was completed.

These cases show that it is possible to deliver these women safely through the natural passages where these passages are not obstructed.

I have been very fortunate in not having many cases come to Cesarean section as emergency cases. I think we have nearer 75 per cent. of elective cases than 3 per cent. The fact that there is early rupture of the uterus during pregnancy in many cases induces me in my service to recommend hysterectomy at the time of the third Cesarean section. I think after a woman has gone through three Cesarean sections we should at least recommend removal of the uterus. Of course, if she objects, that is her business, but it is this early rupture of the uterus during pregnancy which we cannot control.

DR. JAMES E. DAVIS, Detroit, Michigan.—These two papers bring before us a most interesting phase of "preventive obstetrics." I think the advantages of this prevention should be viewed from a consideration of the pathology that prevails in these cases. Anticipating the pathology, it seems to me there should be added to what has already been said a few further considerations. In the first

place, we should, in a general way, consider bad risks those women who have a thin musculature, and also those who have within the uterus at the time of pregnancy a large quantity of amniotic fluid. It has already been mentioned that care should be taken against the introduction of a bag and the use of forceps. The problem, presenting, from a pathological standpoint is this: first, we have a reduction of muscle tissue, of connective tissue, a degradation of the normal tissue; then we have a degradation of the connective tissue by the interposition within the connective-tissue cells of syncytial cells. The connective tissue, while it may in certain instances be as strong as the muscle tissue, yet it is not as resistant to the syncytiolysins which are formed from the syncytial cells, and in the syncytial cells, we have a tissue of a very low resistance so far as its ability to withstand pressure is concerned. That might be illustrated in this way: we will consider the muscular wall. We have in the normal muscular wall connective-tissue elements which in multiple pregnancies are increased, so that we see an increase of this connective tissue everywhere in the muscular wall, but when we have only a connective-tissue wall, we have a considerable thinning of that wall which may have, and we will take it for granted, the same bursting quality as the muscle wall, but when we have interposed in the muscular wall syncytial cells which almost never occur singly but in groups, then the resisting power of the connective-tissue wall is markedly lowered. The syncytial cells may be shown diagrammatically interposed in this manner in the connective-tissue wall, and wherever these cells are interposed there we have a point of very low resistance so far as it relates to bursting pressure. Besides, we have a constant throwing off of the syncytiolysins which have a digestive effect upon the connective tissue.

DR. MAURICE I. ROSENTHAL, Fort Wayne, Indiana.—Durable suture of the uterus postpartum is a difficult thing. While the uterine wall is thick at first in a few days it is much thinner as a result of beginning involution so that primary suture, as mentioned by Dr. Carstens, will stop hemorrhage and that is about all we can expect it to do. Suturing the peritoneal surface, however, I believe is very important. In making suture of the belly wall if you will bring the skin together and there is no blood interposed, the fatty tissues will lie together and heal perfectly. Just so if you will bring the surfaces together, the peritoneal surface carefully, and there is no intrauterine pressure, the uterine wall will lie together very nicely. If you suture this wall ever so carefully, in forty-eight hours, more or less, the sutures are necessarily loose. I imagine they hang there like hoops on a line, yet they are necessary to prevent hemorrhage and leakage for the first twenty-four hours. The important thing after all is infection and that infection is predisposed by intrauterine pressure. The complete cervical dilatation of normal labor promotes a more free drainage of the uterus than frequently obtains after Cesarean section.

DR. IRVING W. POTTER, Buffalo, New York.—I would like to report a case of rupture of the uterus that occurred in Buffalo because

it is the only one we have heard anything about. The patient was a young woman, twenty-three years of age, upon whom I operated two and one-half years ago for a contracted pelvis, delivering a child 9 pounds in weight. It was a midwife's case, and she had been in labor for a considerable time when I saw her, I took her to the hospital and did a Cesarean section, she made a good recovery. She subsequently became pregnant, and fell into the hands of a practitioner who did not believe in operating and who said he could deliver her without any trouble. She had a test of labor for forty-eight hours. The scar in her abdomen indicated that a Cesarean section had been done on a previous occasion, yet she was allowed to go forty-eight hours as a test of labor, which was followed by rupture of the uterus. A surgeon was called in and removed the uterus. The child was dead.

I have operated on a number of cases a second time without any trouble, and you cannot see the scar in the majority of these cases from the outside, but if you feel from below up you will find a thinning in the majority of cases, although it is not enough to make any special difference.

DR. HAYD.—I would like to ask Dr. Bell why he did not sew the uterus together instead of taking it out?

DR. BELL.—I must confess, I was afraid she might die. In order to sew the uterus together I would have been obliged to freshen both edges entirely because, as I tried to tell you in my paper, there was a scar, and except for the fibromuscular bands across, I would have been obliged to remove the surface of the whole scar. I thought I could do the other operation more quickly.

DR. RONGY (closing).—With reference to the dictum, "Once a Cesarean, always a Cesarean," I would like to say that I brought this question up from an academic standpoint. We know what we have to contend with in actual practice; we cannot always choose our cases, neither do we always want to deliver these women by Cesarean section. I think it is very essential for us to come to a thorough and clear understanding of this question because the general medical profession look to us for a final judgment on these questions. It is very necessary for us to make ourselves clear as to what should be done in certain cases and this largely was my object in bringing up this question.

Dr. Carstens brought out a very important point with reference to tying of the sutures in the uterine wound too tightly. When these sutures are tied tightly there is always a reaction around the wound and therefore infection is more likely to take place. Great care must be exercised in suturing the uterine wound.

I never sterilize a woman unless she has had two children, and I only do it at the request of the patient. I do not perform an hysterectomy but resect the tubes on either side. I feel that after resecting and embedding the cut ends of the tube in the wall of the uterus pregnancy will not ensue. It is unnecessary to do an hysterectomy. I feel sure that our knowledge about the uterine scar is very incomplete. It seems to me that no matter how perfectly

the wound united the uterus will not infrequently rupture. In performing repeated section the old scar is very often not observed for the reason that the uterus is in a different angle, it is somewhat twisted so that the old scar is at the side of the uterus out of the line of vision and therefore not easily seen. In a great many cases however, the old scar can be readily seen.

POSTMORTEM CESAREAN SECTION.

BY

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THERE can be no doubt that in all parts of the world it occurs with frequency that women pregnant, at or near full term, die from various disorders and are never delivered; the child perishing from its imprisonment alone, in many instances. This is a deplorable sacrifice to ignorance, indifference or sentimentalism, and it must be admitted that these qualities are not the exclusive attributes of the laity.

The indifferent and callous-minded may be stimulated to some alertness when attention is called to the fact that the law does not countenance that gross neglect which leads to the sacrifice of human life. The unborn child has rights fully recognized in legal enactments and any medical person finding the dead body of the mother covering the unborn viable child and refuses to remove the obstacle, which is suffocating the infant, is guilty of a crime for which he may be justly punished. The consent of no human being is required; time is short, and his duty is plain.

A considerable number of such cases have been reported in medical literature, and while most of the babies so delivered have not permanently survived, some brilliant successes have been chronicled. Without doubt this record may be greatly improved by the application of intelligent foresight and alertness. The unborn fetus frequently survives for a short time after the death of the mother. This fact furnishes the indication for the necessity of immediate action to save the life of a viable child in case of death at or near the end of pregnancy. Runge states that, unfortunately, the rescue of the child after the mother's death is not very common; the fetus dying in many cases before the mother through pathological conditions such as high fever, increased venosity of the maternal blood through cardiac and pulmonary disease; or through a marked lowering of blood-pressure, especially when the mother's death struggle is prolonged.

More favorable cases again are observed when the mother has died suddenly as from the result of accident or from rapidly fatal poisoning. In general, conditions which obviate a long-continued death struggle, undoubtedly, are more hopeful of saving the child's life.

While the prognosis is, therefore, governed by the character of the disease, and especially by the duration of the death struggle, it is imperative in all cases that Cesarean section be performed instantly upon the cessation of the mother's heart beats. It is inexcusable to waste precious seconds of time in the effort to obtain the fetal heart sounds.

No time should be given to the niceties of surgical technic. The abdominal wall should be widely opened by one long free incision of the abdomen and another of the uterus. The child is then immediately removed and efforts of resuscitation vigorously instituted.

In Rubesca's clinic, Prague, Cesarean section after death has been performed since 1896 in six cases, one of which resulted in saving the life of the child. In this case it is notable that the mother had been dead twenty minutes before the child was extracted.

Among 331 Cesarean sections in the last century on dead women, only in six or seven was a living child obtained.

R. Dohrn compiled ninety cases, and Schwarz, in 1862, 107 cases in which not a single living child was obtained, so that the latter considered the operation unnecessary because of failure to save the life of the child. How ill-founded is this pessimistic conclusion, may well be shown by a consideration of more recent clinical reports.

I have compiled well-authenticated cases, with due references appended, from thirty-one operators; of these, fifty-two women were delivered postmortem by Cesarean section. Several of the infants which could not be saved were delivered with hearts still beating; some breathed a few times; a few lived more than a day; but the gross results were that of the fifty-two babies thirty were lost and twenty-two or 42.3 per cent. were saved.

A remarkable case was reported by Dr. J. L. Cleveland. The mother died of convulsions; owing to a number of circumstances, Cesarean section was not performed until a full hour had elapsed since the mother's death. The child was asphyxiated but heart pulsations were perceptible to the hand. It soon gasped and was fully restored. The length of time which passed between the death of the mother and the removal of the child was much more considerable than is generally supposed to be the extreme limit of possible

hope for survival of the child. Cleveland believes that when viability is limited to fifteen to thirty minutes after maternal death, the well-known capacity of the fetus for resisting asphyxia is not taken fully into account, and that it will be increased by the residual oxygen within the placenta at the time of the mother's death. Two recent cases occurring at St. Vincent's Hospital, Indianapolis, proved brilliantly successful and reflect unusual credit on two internes of that institution.

CASE I.—Reported by Dr. B. A. Hatfield. Patient, Mrs. R., seven months pregnant. Nov. 17, 1915, she complained of earache and, a few hours later, a discharge from the ear. Headache and meningeal symptoms quickly followed. Drs. Neu and Kelley called Dr. Barnhill thirty-six hours after the first symptoms. A laboratory examination showed positive pneumococcic meningitis. Patient unconscious at this time; rapid pulse; temperature 104° F. Patient was taken immediately to hospital for mastoid drainage; but Dr. K. P. Ruddell pronounced her in a dying condition and unfit for an anesthetic. She died one hour later. It had been impossible to find radial pulse for fifteen minutes before death and respirations were only about five per minute before death. Patient died at 5 P. M. Nov. 19, 1915. Five minutes after death an incision was made, about 3½ inches long, below umbilicus in the median line and a 5-pound boy of about seven month's gestation was delivered in about three minutes, crying lustily. Baby did nicely after feedings were adjusted and is now healthy and doing as well as any normal baby of its age.

CASE II.—Reported by Dr. Clarence N. Sonnenburg, Indianapolis, Interne St. Vincent's Hospital. Mrs. R. S., aged twenty-seven, white, female, housewife. Entered St. Vincent's Hospital in June, 1916, to await confinement, which was expected at any time. No family history was obtained. Previous history: The patient had complained of headaches for the past twenty years. But beside the headaches and chronic constipation, she enjoyed good health. There was no elevation of temperature. Two years ago she was operated upon for suspension of the uterus and ruptured perineum in hopes of relieving the headaches, but with no results. Her eyes were also examined and found normal. No history of lues.

Patient had two uneventful previous pregnancies; no miscarriages. She had marked arteriosclerosis with a blood pressure varying during her pregnancy from 180, s, to 210, s. The urine contained no albumen nor casts. Two days before entering the hospital there was edema of the lower extremities which persisted. There was evidence of congestion of both lungs, endocarditis, myocarditis, and acute dilatation. On the morning of May 20, she had a pulmonary hemorrhage for which a hypodermic of morphine sulphate, gr. ⅛, was given. She then rested quietly and was removed to the hospital. At 6 P. M. I was called to her room, but she died before my arrival. Efforts were made to resuscitate her while another nurse was sent to the surgery to obtain instruments for a Cesarean section. So

much time had elapsed in the effort to restore her that I feared to wait for the instruments and performed a Cesarean section with a pearl handled knife, 5.5 inches in length, with 2.5 inch blade. The knife was new, sharp, and had not been used before. Without removing the body from the bed I made an incision commencing 1 inch above the umbilicus and extending 6 inches downward in the median line. There was no hemorrhage. The second incision was made into the uterus, sufficiently large to introduce my index-finger, which was used in place of a groove director to prevent injury to the child. I removed the baby from the uterus and ligated the umbilical cord.

The baby, a girl, was resuscitated in four minutes and has been gaining in weight rapidly. It was full term, weighed seven and one-half pounds, and normal in all respects. The baby is still living, hearty and well.

Successful cases were reported by Hanch, one; Cathala, one; Descurres, one; Bonnaire, one; Leuppert, one; Möglick, one; Moetague, one; Maygeier one; Cleveland, one; Weissnange, one; Koerner, one; Wyder, one; Everke, one; Keinski, two; Rudens, two; Blau, one; Loerssin, one; St. Vincent's Hospital, Indianapolis, two; Lying-In Hospital, New York, two.

Failures were reported by Cathala, one; Bonnaire, one; Porak, one; Boissard, one; Leuppert, two; Lippel, one; Remy, one; Vermden, one; Koerner, two; Wyder, one; Everke, two; Keinski, one; Litschkiss, one; Tyler, one; Howe, one; Kallmoegen, one; Hell, one; O.G.P., one; Lying-In Hospital, New York, eight. Hence in fifty-two cases of postmortem Cesarean sections the life of the child was saved twenty-two times; lost, thirty times.

In conclusion I would express myself as in sympathy with the suggestion that in certain cases of pregnant women, at or near term, who are known to be hopelessly ill from rapidly progressing disease, Cesarean section is justifiable to save the life of the child. Of course if she be conscious the patient's consent must be obtained. If this were the accepted rule, no doubt many lives could be saved which are lost under the present plan of waiting for the mother to breathe her last, and for the final heart-beat to give us the tardy signal for action.

DISCUSSION.

DR. GORDON K. DICKINSON, Jersey City, New Jersey.—It seems to me that the doctor has demonstrated this to be a rather new type of operation. Postmortem hysterotomy has been done in our town twice of late in the hospitals. The intern sat by the side of the bed until almost the last moment, and then proceeded to deliver both cases with a live child. Both were medical cases; they did not occur in my service, so I do not know the details. Cases like

this should appeal to the hospital young man and make him alive to the circumstances.

DR. O. H. ELBRECHT, St. Louis, Mo.—This paper has interested me very much. There are certain medicolegal questions that come into play in these cases which we have to consider. In the cases of Dr. Pfaff these questions would not come up because his cases were brilliant successes, on the other hand, if you do a postmortem without the consent of the family, you are liable by certain laws in this or that State. In Austria there is an old law on the statute books that makes it compulsory for the first doctor who sees the corpse of a pregnant woman of six months or more gestation within one hour of the time of death to do a postmortem hysterotomy. Judging from the fact that this old law still exists it would seem that enough babies have been saved by the procedure to make it justifiable. In our country the legal question must be considered, because if we perform a postmortem without consent of the family and do not save the child we are rendering ourselves liable to a lawsuit. If you have time to consult relatives about this you can point out to them the possibilities and by so doing you are not liable in a case of nonsuccess.

I wish to congratulate Dr. Pfaff on the result in both cases.

DR. EDWARD J. ILL, New Jersey.—Such cases as Dr. Pfaff has reported are very interesting and instructive to us. It is always proper to open a woman immediately after death and remove the child.

I may say that the reason for the Austrian law compelling every practitioner to do a Cesarean section on the dead woman is that the baby may receive the blessing of baptism.

DR. PFAFF (closing).—There is not very much I wish to add to what I have already said, but the legal point is one I think we should not overlook. I have looked it up lately and the sum and substance of it is like this: this is a living child; it is a human being that has rights moral as well as legal. I think it is well established that a living unborn child has legal rights. Here is a dead body lying in such a relation as to threaten the life of this human being, and I do not think any one of us would knowingly allow this dead body to jeopardize the life of another individual. Recently I read a decision of the kind which holds that a human life that is jeopardized should have intelligent treatment, and the doctor, the only informed person present, is the one who should give that intelligent treatment. We have no right to imperil the life of the living child though unborn, and the doctor has no right to kill that child by his gross neglect. He would be sustained by the law, should he interfere even against the protest of the husband or others.

DR. J. HENRY CARSTENS, Detroit, Michigan.—I would like to ask if there is any Jewish law in the Talmud that a woman like this must be opened? I think there is such a law that has been handed down to us from prehistoric times. However, I am not very well posted on this phase of the subject.

DR. HENRY SCHWARZ, St. Louis.—Dr. Carstens refers to the lex

regia of Numa Pompilius, the second king of Rome. It is a good old Roman law and will serve as a precedent in the United States any time.

DR. PFAFF (closing).—An attorney was recently asked to address the New York Academy of Medicine on this subject and he brought out very clearly and distinctly that the law would stand by us in cases of forced intervention, but it would not stand by us if we refused to interfere.

GUNSHOT WOUNDS OF THE ABDOMEN IN PREGNANT WOMEN.

BY

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ON October 21, 1915, Mrs. A. K., aged twenty-five, the mother of one child, being pregnant at full term, was accidentally shot in the back by her husband. The bullet entered about an inch below the twelfth rib, on the right side, at the outer edge of the quadratus lumborum and could be felt lying under the skin of the abdomen about 2 inches above and 2 inches to the right of the umbilicus. The patient, on admission, was rather poorly nourished, but the heart and lungs were normal and the urine free from albumin. She seemed to be in much pain, was greatly frightened, but not in severe shock. P. 100, T. 99.4°, Res. 26 and entirely thoracic. The abdomen was tense and hard, very sensitive and slightly distended. A small amount of blood was escaping from the wound in the back. The child's heart was strong and nearly normal in rate.

The woman's condition demanded immediate exploration of the abdomen. This was done within less than three hours after the accident. The peritoneal cavity contained a large amount of free blood and coagula. Amniotic fluid was found mixed with blood free in the abdomen. A perforation could be felt on the posterior wall of the uterus, somewhat to the right of the midline and about 3 inches below the fundus. A second perforation was present on the anterior wall of the uterus a little nearer the midline than the posterior wound, and about 2 inches below the fundus. The course of the bullet between the two openings was about 5 inches. It was found impossible to properly explore the abdomen for intestinal perforations on account of the presence of the full-term uterus. Cesarean section was, therefore, immediately done. The incision in the uterus was immediately over the placenta, located anteriorly and in the upper part of the uterus. The placenta had been perforated by the bullet. The child was delivered readily and began to breathe immediately. It was uninjured except that the ring finger on the left hand had been broken and lacerated by the bullet. The uterus contracted normally. The uterine incision and the two bullet wounds were closed with chromic catgut.

The excess of blood was sponged out of the abdomen, and the entire intestinal tract examined for perforations. It was found that the bullet had entered between the folds of the mesentery of the ascending colon and passed through the gut making two perforations. It had then gone through the uterus and into the abdominal wall without injuring the small intestines or any other organs.

The escape of the small intestines was due to the fact that the uterus, as is usual, lay more to the right side of the abdomen and the small intestines to the left, and also to the fact that the bullet passed through the right side of the uterus.

The perforations in the colon had leaked very little. They were closed in the usual way. The posterior opening, which was in a part of the gut not covered by peritoneum, was closed as well as possible, and a drain passed down to it. There was no leakage from the bowel after the operation. The abdomen was drained by inserting three soft rubber tubes; one to the bottom of the culde-sac, another to the outside of the ascending colon, where there had been some soiling, and a third at the point of perforation. The mother left the operating-table with a pulse of 100 and made an uninterrupted recovery. There was some drainage of pus with a colon bacillus odor, but no drainage from the intestine. The highest pulse rate after the operation was 120. The highest temperature 101° F. Patient was in the hospital thirty-five days and left with the wound entirely healed. She was able to nurse her baby. The child was a strong hearty infant and has developed nicely. The broken, lacerated finger was pieced together and healed, *per primam intentionsum*, slightly deformed.

A gunshot wound in the abdomen of a pregnant woman differs somewhat from one in the abdomen of a woman who is not pregnant. The dangers of hemorrhage and of infection from a perforated intestine exist in each; but the pregnant woman, on account of her condition, runs a greater risk. The danger of a bullet causing serious hemorrhage in the abdomen is greater during pregnancy, and this danger increases as gestation advances.

Infection in the abdomen of a woman is more serious during pregnancy than at any other time. This fact is well borne out by the high mortality from ruptured appendices among pregnant women.

The management of a gunshot wound in the abdomen of a pregnant woman differs chiefly in the problems which arise from the presence in the abdomen of the enlarged uterus or from the injuries this organ may receive. The question at once arises whether the uterus shall be emptied or not, and whether it shall be done by Cesarean section, with or without hysterectomy.

It is a well-settled principle in civil practice, where conditions permit that, when a bullet perforates an abdomen, an exploratory

laparotomy shall be done without delay. This rule applies with even greater force in the case of pregnant women because there is the added danger of injury to the enlarged uterus along with the inherent risks which accompany the pregnant condition.

In this connection it is interesting to note that in not a few of the cases reported in the literature, in which pregnant women were shot through the abdomen, recovery took place without operation. Moreover, in quite a number of the cases in which the abdomen was opened, no intestinal perforations were found. In these cases the pregnancy was usually well advanced, so that the intestines were pushed up out of the lower abdomen. The wounds themselves were, as a rule, well below the umbilicus.

In the care of perforating wounds of the abdomen in pregnant women the question of emptying the uterus arises immediately. All will depend upon the general condition of the patient, whether the uterus is injured or not, and whether the pregnancy is in an early one or near term.

It is worthy of note that, in the cases found in the literature, in which the uterus was perforated or severely injured, the organ promptly emptied itself in the majority of cases. If the pregnancy is at term, even with the uterus uninjured, it is necessary to do a Cesarean section because it is very difficult to properly explore an abdomen if it contains a full term pregnancy. Moreover, as the child is fully developed it is to its best interest that it be delivered, at once. Another reason why the uterus, at or near term, should be emptied in the case of a bullet wound of the abdomen is, that if a perforation of the intestine is present, peritonitis may develop, the risk from which will be greatly increased if labor sets in within two or three days after the operation and before the infection is securely walled off.

In treating peritonitis we endeavor not only to keep the patient quiet, but even prevent peristalsis so that adhesions may form and localize the infection. It is easily apparent that a violently contracting and finally collapsing uterus would be very likely to break up adhesions and spread an infection which might otherwise become localized. In the presence of an actually existing peritonitis, or in an abdomen badly soiled with feces, one might not open an uninjured uterus and expose its well known avenues of infection to contamination unless it were done chiefly in the interests of the child.

In pregnant women with gunshot wounds of the abdomen the gestation has not always advanced to a point when the child is viable. The uterus, too, may not be large enough to greatly impede

an exploration of the abdomen. In such cases the emptying of the uterus will depend upon whether the organ has been seriously damaged or not. If the uterus is uninjured or only superficially wounded, it may be left alone. If, on the other hand, the uterus is shot through, it will probably be safer for the mother if the gestation is terminated at once. It is worthy of note that in the cases reported in which the uterus was shot through, the child was usually killed by the bullet and abortion followed quickly.

In an early pregnancy it will make less difference whether an injured uterus is emptied or not because if it aborts it will cause less commotion and be less likely to spread infection. Moreover in such cases, if there is no injury to the intestines, one may be more conservative with an injured uterus, because infection is less likely to develop.

The method of emptying the uterus will depend upon the duration of pregnancy. As the abdomen is already open Cesarean section will naturally be used if the child has reached any considerable size. In the earlier stages the pregnant uterus, unless badly lacerated, should be left to take care of itself or emptied through the cervix. In certain cases, when the uterus is badly lacerated, or when for some reason it is infected, hysterectomy will be necessary. Hysterectomy in gunshot wounds of the uterus is rarely necessary. The patients are considerably shocked by the hemorrhage and fright. This shock will be augmented by the necessary inspection of all the abdominal organs, including the entire intestinal tract. The uterus is not necessarily infected and will take care of itself almost as well as the other abdominal organs. The woman herself will be more likely to combat the infection if her vitality is not lowered by too much surgical intervention.

Drainage will, of course, be used in all gunshot wounds of the abdomen in pregnant women. There will be considerable blood in the abdomen which cannot be removed during the operation, and this blood serves as a culture medium for infection which a dirty bullet or a perforated intestine may furnish. Moreover, in the rapid inspection of the intestinal tract, one cannot be certain that he has not overlooked a perforation. Good drainage will remove the blood more safely than it can be done by irrigation. Irrigation of the abdomen in cases of gunshot wounds will rarely be necessary. Occasionally, when there is extensive soiling of the peritoneal cavity by feces, and when the case is early and the patient's condition otherwise good, it may be considered.

Neugebauer(1) was the first to report the cases of gunshot wounds of the pregnant uterus. He found twelve cases.

Estor and Puech(2) reported all kinds of perforating wounds of the pregnant uterus and among them ten due to gunshot wounds.

Gellhorn(3) went over the literature and reported all cases up to that date. The following represents a fairly complete list of all cases to date.

CASE I.—Mrs. J. M., in the seventh month of pregnancy, was struck in the buttock by a bullet which passed upward and inward into the uterus without injuring any other organ(4). Blood and amniotic fluid escaped immediately from the cervix. Labor came on almost at once and she was delivered promptly. Recovery was uneventful without further interference.

CASE II.—A Chinese woman, twenty-six years of age, in the ninth month of pregnancy, received a bullet wound in the abdomen three inches above and a little to the left of the umbilicus at about the level of the fundus of the pregnant uterus(5). The pulse was 126 and weak. The respirations were 28 and the general condition good. The abdomen was opened and much blood with clots removed. The intestines were not perforated. A bleeding wound one inch long was found on the anterior part of the fundus. The placenta, lying under this wound, had been perforated. A living child was delivered by Cesarean section and the abdomen was drained. The mother died on the fourth day of hemorrhage, it was thought.

CASE III.—Mrs. W., aged twenty-eight, in the seventh month of pregnancy, was struck in the abdomen by a bullet at a point 3 inches above and 2 inches inside of the right anterior superior spine(6). There were no signs of hemorrhage, no distention and the fetal heart could be heard. Twelve hours after the injury the abdomen was opened. Cesarean section delivered the child which had been killed by the bullet. A hysterectomy was done, using the wire écraseur. Six perforations of the ileum were found and a large mesenteric artery ligated. The abdomen was washed out with boric acid solutions and a glass drainage tube was inserted Operation one and a half hours. Death occurred on the seventh day from peritonitis.

CASE IV.—A woman, nineteen years of age, in the eighth month of pregnancy, received a thirty-two caliber bullet 1½ inches below the ensiform cartilage and a little to the left. There were signs of internal hemorrhage, with distentions and absence of liver dulness(7). Operation two hours after the injury revealed much blood from a liver wound and also two perforations in the stomach. The bleeding was checked, the perforations closed, and the abdomen was irrigated and closed with drainage to the liver wound. The uterus was not wounded, but the woman was delivered normally on the second day. The recovery was uneventful except for a little pus from the liver drainage.

CASE V.—Mrs. M., twenty-one years of age, and in the sixth month of pregnancy, was shot in the upper abdomen(8). The bullet passed through the liver, diaphragm, pleura and the left lung. The uterus was uninjured. After some sign of pneumonia she recovered without operation and six weeks later was delivered normally.

CASE VI.—Eva M., aged twenty, colored, in the sixth month of pregnancy, was shot in the abdomen at a point 4 inches to the right of the umbilicus(9). There was no shock, and pulse was 100. On opening the abdomen it was found filled with blood. There was a large wound in the fundus of the uterus just in front of the right tube. There was no wound of exit. The bleeding uterine wound was closed. There were no wounds of the intestines. The abdomen was washed out and drained. The patient aborted the next day and the fetus was found to have been killed by the bullet. The mother recovered.

CASE VII.—A woman, twenty-eight years old, pregnant at full term, was wounded in the abdomen at a point 2 inches above the right anterior superior spine of the ileum(10). The course of the bullet was downward and forward. There was no shock or other serious symptoms. In forty hours she was delivered of a dead child with the bullet in its abdomen. The mother recovered.

CASE VIII.—A bullet penetrated the abdomen and the walls of the uterus in a pregnant woman and killed the fetus(11). The mother recovered.

CASE IX.—A woman, pregnant at full term, was shot with a rifle in the lower abdomen(12). There was a severe hemorrhage followed by syncope. Labor followed immediately and patient was delivered without laparotomy. Both the mother and child lived.

CASE X.—A colored woman, eighteen years old, in the sixth month of pregnancy, was struck by a bullet 1½ inches above the right anterior superior spine of the ilium(13). There was no wound of exit. Labor followed with delivery the next day. The bullet had passed through the child. Severe infection followed but the mother recovered. There was no operation.

CASE XI.—A woman, nine months pregnant, was shot in the abdomen. Amniotic fluid and blood escaped(14). She was delivered normally in eleven hours. The child had been struck by the bullet and lived only eight hours. The mother had symptoms of peritonitis, but recovered without operation.

CASE XII.—A woman, five months pregnant, was wounded by a bullet to the right and below the umbilicus(15). There were no serious symptoms. Laparotomy in six hours revealed a wound of the uterus 3 inches below the fundus with no wound of exit. The uterine wound was sutured and the abdomen closed without drainage. Two days later she was delivered of an uninjured five months' fetus. The mother recovered.

CASE XIII.—A woman, nineteen years old, four and one-half months pregnant, received a bullet wound in the abdomen 5 inches to the right of the umbilicus(16). There was severe shock. Laparotomy after five hours showed a large amount of blood and

amniotic fluid in the abdomen. Five perforations of the ileum necessitated resection. A large mesenteric artery was bleeding and was ligated. The uterus was perforated and the umbilical cord protruded. The piece of cord was resected and the stump pushed back into the uterus and the uterine wounds sutured. The abdomen was closed with drainage. The fetus was delivered thirty hours later. The mother recovered.

CASE XIV.—Reports that Billroth saved a mother's life in a case similar to Albarrans(17).

CASE XV.—Cesarean section with fatal result(18).

CASE XVI.—A woman of eighteen years at term received a bullet wound to the right and below the umbilicus(19). There was little shock and no external bleeding. Labor set in in one hour and delivery was accomplished in twelve hours. Sharp postpartum hemorrhage necessitated manual delivery of the placenta. The hand in the uterus showed a hole in the anterior wall of this organ. The bullet had killed the child. The mother recovered without operation.

CASE XVII.—A woman, aged thirty-four, in the eighth month of pregnancy, was shot in the right lower abdomen(20). There was much pain and loss of blood and amniotic fluid. The child's movements stopped at once and the fetal heart could not be heard. Labor pains began very soon. Laparotomy showed a wound in the uterus 2 inches below the right tube, but no injury to the intestines. A dead child was delivered by Cesarean section and the abdomen drained. The mother recovered after a serious septic period.

CASE XVIII.—A woman of twenty-nine, at full term, was shot in the left side of the abdomen(21). A quantity of yellow fluid escaped. There was considerable peritoneal irritation. Laparotomy three and a half hours after the accident showed a wound in the fundus below the left tube. Cesarean section delivered a dead child. The bullet wound was sutured and the abdomen closed without drainage. No intestinal perforation was noted. The mother died on the sixth day of peritonitis.

CASE XIX.—Bullet wound of the uterus perforating the pelvis and uterus(22).

CASE XX.—A woman of nineteen years, in the seventh month of pregnancy, was shot in the right side of the abdomen 2 inches above the anterior superior spine of the ilium(23). There was evidence of severe internal hemorrhage. Laparotomy showed the uterus perforated, but no intestinal injury. Cesarean section delivered a living six and one-half months' fetus which soon died. Drainage was instituted and the mother recovered.

CASE XXI.—A pregnant woman was torn open by a cannon ball and a living child delivered(24).

CASE XXII.—A woman, three months pregnant, was shot in the abdomen receiving eight perforations of the intestine(25). Operation was done and the perforations closed. The woman recovered.

CASE XXIII.—A woman of nineteen years, six and a half months pregnant, was stabbed in the abdomen 1½ inches below and

4 inches to the right of the umbilicus(26). The wound healed uninterruptedly. She was delivered at term of a living child with intestines protruding through healed abdominal wound.

CASE XXIV.—A woman of nineteen years, in the eighth month of pregnancy, was wounded in the left abdomen midway between the anterior superior spine and the umbilicus(27). There was a second wound 4 inches above this. There were two wounds of exit. Laparotomy showed much blood, but no intestinal injuries. The fundus was perforated in two places. Cesarean section was done and the abdomen closed. Both the mother and child recovered. The child was injured only in the fingers.

CASE XXV.—Woman of twenty-three years, seven months pregnant, was shot in the abdomen 2½ inches below the ensiform cartilage, and ½ inch to the right of the midline(28). Pulse 120, temperature 100°, respiration 28. Serous fluid and gas were escaping from the wound. The abdomen was opened twenty-four hours after the accident and the stomach and jejunum found perforated. The abdomen contained pus, blood and stomach contents. There were many adhesions. The uterus was not injured. The abdomen was washed out and searched for further perforations. The perforations were then closed and the abdomen drained. The woman was delivered normally at full term.

CASE XXVI.—Henrot reports that a mother while on her way to the maternity hospital in Rheims had her abdomen torn open by a shell and died immediately(29). The child was uninjured and had only to be lifted out.

CASE XXVII.—Penetrating gunshot wound of gravid uterus(20). (Case Report.)

CASE XXVIII.—Mrs. F. F., an Italian woman, thirty-six years old, in the fourth month of pregnancy, received a load from a shot gun in the right lower quadrant of the abdomen(31). She was admitted in shock and with a distended abdomen. The wound was bleeding freely. Temp. 98°, pulse 63. At operation forty small perforations of the intestines were closed. The uterus showed a 4-inch laceration on its anterior wall, which was a tear, and not due to the shot. The fetus was free in the abdominal cavity, and the placenta was still in the uterus. The placenta was removed and the uterus closed as in Cesarean section. The abdominal cavity was irrigated and closed with drainage. The mother made a good recovery.

CASE XXIX.—A girl of sixteen years, at full term, shot herself in the abdomen(32). The bullet entered 7 inches to the right of the umbilicus and made its exit an inch to the left of the umbilicus. There was little shock, pulse 116, respiration 34. The umbilical cord protruded from the wound of exit. On opening the abdomen a full-term child was found free in the abdomen. It had been killed by the bullet. A powder burned diagonal wound, 4 inches long, was found in the uterus. The placenta, which was still in the uterus, was removed, and the uterus closed after the wound had been

trimmed. The abdomen was irrigated and closed with drainage. There was some infection, but the mother recovered.

BIBLIOGRAPHY

1. Neugebauer, F., *Münchener med. Wochenschr.*, 1897, No. 19.
2. Estor and Puech. *Revue de Gynecologie*, vol. iii, No. 6, 1899.
3. Gellhorn, Geo. *St. Louis Medical Review*, 1901, xliv, 307.
4. Baughman, J. A. *J. A. M. A.*, 1897, xxviii, 406.
5. Tucker, A. W. *J. A. M. A.*, lviii, 1685.
6. Prichard, A. W. *Brit. Med. Jour.*, 1896, i, 332.
7. Wood, W. C. *Brooklyn Med. Jour.*, 1902, xvi, 395.
8. Milner, C. A. *Med. News*, Phila., 1892, lxi, 243.
9. Bradley, C. C. *N. Am. Pract. Chi.*, 1890, ii, 568.
10. Staples, F. *Med. Rec.*, N. Y., 1876, xi, 595.
11. Rousett (Cited.) Colombat de L'Isere Diseases and Special Hygiene of Females, 1848, p. 227.
12. Reichard, abstract. Gellhorn. *St. Louis Med. Review*, 1901, xliv, 307.
13. Hays. *New Orleans Med. and Surg. Jour.*, 1879, p. 510.
14. Applewhite and Pernot. *Med. World*, Oct., 1892.
15. Kehr, H. *Centralbl. f. Chirurgie*, 1893, No. 29, p. 636.
16. Albarran. *Bull. et Memoires de la Societe de Chirurgie*, 1895, p. 243.
17. Pozzi. *Soc. de Chir.*, March 17, 1895.
18. Hohl. *Centralbl. f. Gynaek.*, 1898, No. 44, F, 1218.
19. Robinson, S. W. *Lancet*, 1897, Oct. 23.
20. Wrzesniowski and Neugebauer. AMER. JOUR. OBST., xxxvi, 136.
21. Rubetz. *Jour. f. Geb. and Frauenkrankh.*, April, 1898.
22. Nasilow, abst. Gellhorn. *St. Louis Med. Review*, 1901, xliv,
23. Nietert, H. L. *St. Louis Med. Review*, April 20, 1900.
24. Stalpart. Cited in Anomalies and Curiosities of Nature, 1900, p. 134.
25. Rebreyend and Barbarin. AMER. JOUR. OBST., 1899, xxxix,
26. Steele, D. A. K. *Surg., Gyn. and Obst.*, 1908, vi.
27. Fowler, R. S. *New York State Jour. of Med.*, Nov., 1911.
28. H. M. Lee. *Annals of Surgery*, vol. xlviii, p. 857.
29. Hernot. *J. A. M.A.*, vol. lxv, p. 2019.
30. Holland, R. A. *Maine Med. Ass. Jour.*, Portland, June, vol. iv, No. 11, 1914.
31. Lincoln, Davis. *J. A. M. A.*, vol. lxiii, 243.
32. Fudge, Herbery W. *J. A. M. A.*, vol. lviii, 779.

DISCUSSION.

DR. JOHN D. S. DAVIS, Birmingham, Alabama.—I do not like to let this paper go by without some discussion, I desire to report a case of gunshot injury in a woman pregnant three months and a half. She was handling a small rifle when it accidently went off and

shot her through the abdomen, making twenty-one perforations, two through the mesenteric border of the transverse colon, and nineteen through the small intestine. She was brought by train eighty-five miles, and I saw her twelve hours after the reception of the injury. There were five perforations on the mesenteric border of the intestine, two perforations on the mesenteric border of the transverse colon. I turned back the serosa of transverse colon, turned in the musculature, and then closed the serosa over this. Instead of doing two resections, I took out 5 feet of the intestine including the nineteen perforations in the gut, and she recovered, and was delivered of a living child at the ninth month.

TEACHING OBSTETRICS UNDER IMPROVED CONDITIONS.

BY

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SEVERAL factors render conditions for teaching obstetrics, in the reorganized Washington University Medical School, sufficiently favorable to enable the Department of Obstetrics and Gynecology to do reasonably good work alongside of the Departments of Medicine, Surgery and Pediatrics, all of which have been placed on a strict university basis.

The main reason for this desirable state of affairs is found in the friendly attitude of the Corporation of the University and of the Executive Faculty toward the Department of Obstetrics and Gynecology; both of these bodies appreciate the desirability of placing obstetrics likewise on a university basis, and they are determined to bring this about as soon as circumstances will permit.

In the meantime, they have made very reasonable provisions for this department by giving it reasonable laboratory space and by furnishing it with dispensary and hospital facilities unsurpassed anywhere; they have taken further care of the department by an annual budget, which provides effectively for laboratory and teaching supplies and equipment; the budget also provides salaries for one laboratory technician, one laboratory instructor, one resident physician, two assistant resident physicians, and a modest salary for the chief of the department. The department's house staff consists of one resident, two assistant residents, and three house officers; all six are taken care of in splendid officers' quarters; they receive their keep and laundry; but the house officers receive no salary.

Before the reorganization of the school, the department was under considerable annual expense in maintaining its own museum and its own library; this expense is now entirely done away with, because the department of pathology takes care of all pathological specimens in an excellently furnished museum where they are, at all times, available for teaching or for investigation; in like manner, the splendid library of the medical school, which already contains over 23,000 bound

volumes, and which receives 353 of the most important medical periodicals, of which over 300 are in complete series, makes it unnecessary for the department to expend money for library purposes. Laboratory guides, text-books and other publications, which the department desires for more or less continued use, are promptly supplied; in fact, during the summer vacation when the library committee is not in session, the heads of departments are empowered to order on their own judgment such publications as they stand in urgent need of to the amount of thirty dollars for each department. The school workshop is another time and money saving institution; it has proven especially helpful in keeping manikins and other teaching apparatus in repair.

The temporary quarters, which the Department of Obstetrics and Gynecology at present occupies, were placed at its disposal by the Departments of Medicine, Surgery and Pathology; I take particular pleasure in recording the fact that each of these departments gave up some of its very best space, so that Obstetrics and Gynecology are housed as comfortably as are Medicine and Surgery, and, were it not for the fact that these latter departments will, before long, need the space which they have given up temporarily, there would be no urgent need for a women's clinic, which the university expects to erect on the medical campus.

On this campus are located the North Laboratory Building and the South Laboratory Building, housing the departments of Anatomy, Biological Chemistry, Physiology, Pharmacology, Experimental Surgery and Preventive Medicine; the Dispensary Building, housing the Department of Pathology and Bacteriology on the two upper floors; the clinical laboratories (pathological, bacteriological, physiological and chemical) of the Department of Medicine on the second floor, and the Washington University Dispensary on the first floor and the basement; on the third floor are also the headquarters and laboratories of the Department of Obstetrics and Gynecology; on this campus are also located the Barnes Hospital, the Saint Louis Children's Hospital and the Home for Nurses; two private residences which were on the site before it became a medical campus, have been arranged to serve as a temporary hospital for colored patients; plans have been completed and specifications drawn for the erection of a new pavilion for colored patients on a less conspicuous part of the campus; when this is completed, these former residences will be torn down, and the Women's Hospital erected on this site. All buildings on the campus are connected by corridors and tunnels and a central

power plant furnishes light, heat, power, refrigeration and compressed air to all of them.

THE DISPENSARY SERVICE

The dispensary for women is conducted on the first floor of the dispensary building daily from 2 to 4 P. M. in the splendidly equipped dispensary rooms of the Department of Surgery, which uses these rooms in the forenoon only. The hearty coöperation of the Department of Nursing, and the Department of Social Service helps a great deal to render the dispensary service satisfactory to the patients and to the dispensary staff.

The fact that the dispensary hours fall in the afternoon makes it possible to detail one house officer and one assistant resident for dispensary duty, thereby reducing the burden on the chief of clinic and his assistants and compensating any irregularity in their attendance. This part of the service, however, is so important to the department and confers such benefits on the volunteer staff, that irregularities in attendance are very exceptional, and there is always a waiting list of competent men, who have grown up in the department and who are anxious to fill vacancies.

In the dispensary gynecological and obstetrical patients are segregated; the gynecological cases are treated or asked to enter the Barnes Hospital, according to the nature of the cases; the obstetrical cases are encouraged to come to the dispensary early and at regular periods. Besides the regular dispensary record, a special obstetrical record is kept, which remains in the care of the house officer on obstetrical out-patient service. A prenatal nurse, who is a salaried social service worker, and who is assisted by student-nurses, gives the expectant mothers necessary instruction at the dispensary and at their homes, visits them to ascertain their home conditions, and follows them up in case they fail to return to the dispensary as instructed.

Normal cases, whose home conditions are adequate, are delivered at their homes, unless they prefer to come into the hospital and are able to pay the ward fee; all other cases are recommended for admission to Barnes Hospital. When one of the cases registered for home delivery goes into labor, a telephone call is transmitted to the house physician on out-patient duty; he details one of four senior students, who are on obstetrical service and who have comfortable quarters above the Womens' Colored Ward, to the case, and accompanies him or follows him as soon as possible; in daytime an obstetrical nurse (a senior student nurse) is likewise furnished. In case of serious

complications a city ambulance is called and the parturient woman is transferred to Barnes Hospital as a free patient.

Women who are delivered at their homes receive postnatal nursing care, are regularly visited by the attending senior student and a house officer, and return to the dispensary for a final examination and formal dismissal at which time their baby is entered at the clinic for well babies conducted by the Department of Pediatrics; if they fail to return to the dispensary for this purpose, they are followed up by social service workers.

The work of the obstetrical out-patient service is controlled by an instructor, who sees to it that proper records are kept and preserved, and who drops in on the service at unexpected times to see that the patients receive the proper attention and visiting.

THE HOSPITAL SERVICE.

The admission of patients to the obstetrical and gynecological service of Barnes Hospital is the duty of the resident, or in his absence of one of the assistant residents, after the requirements of the front office have been complied with.

Barnes Hospital is not a free hospital, but an ample number of free beds are available in the following manner: Each of the three services is entitled to one free patient for every four pay-patients, so that if the obstetrical-gynecological service has twenty-four pay-patients, that service is entitled to six free patients.

Additional free beds have been made available by the liberality of Mr. Robert S. Brookings, the president of the University, who personally pays for twenty free beds each day of the year. The free beds are distributed as follows: Medicine eight, Surgery eight, Obstetrics four. This is a fair distribution made at the suggestion of obstetrics, because medicine and surgery have to take care of all the specialties; yet obstetrics wanted a free-bed-budget of its own which it can use to the following advantage:

The free beds allowed by Barnes Hospital, under the four to one rule, are all used up from day to day, and it would often be impossible to admit obstetrical patients on the free list when they come in as emergencies or when they are wanted for bedside instruction, were it not that by arrangement with Mr. Brookings the 1460 free hospital days, provided by him for obstetrics, can be used up at the time when most needed, that is, during the session of the medical school. By using fewer than four Brookings beds per day during the early part

of the fiscal year, a larger number than four are available during the school session.

All hospital cases, except emergency cases, are carefully worked up by the house-staff before being seen by the visiting instructors. The house-officers take histories, make physical examinations, do the routine laboratory work in the ward laboratory, enter the findings of instructors or of the chief on the record, have cases prepared for delivery or operation, assist in major operations and perform minor operations under supervision.

Two instructors make regular ward rounds and supervise the work; they are on alternating service; each serves six months on obstetrics and six months on gynecology; they submit written suggestions as to diagnosis and treatment in important cases, which are discussed in conference; they do considerable emergency work and also major operative work with the approval of the chief or his associate (Dr. Crossen).

All material obtained by operation, including curetments and trial excisions, is sent to the department's laboratory, where slides are prepared and filed away for permanent record; for the purpose of diagnosis in doubtful cases the Department of Pathology, which is located on the same floor, is freely consulted; a pathological diagnosis is sent to the ward in all cases and entered on the patient's record. Gross material, which is desired for permanent preservation, is turned over to the Department of Pathology, which attends to the proper preparation and cataloguing of museum specimens.

In case a patient dies, the consent for autopsy is usually obtained; members of the house-staff are present at the autopsy and attend the clinical and pathological conferences which the Department of Pathology conducts once a week. All clinical records are looked over at a staff conference before being sent to the record room for filing.

The house-staff rotates in the various duties as follows: each house-officer serves four months on the obstetrical house service; four months on the obstetrical out-patient service and four months on the gynecological house-service; the assistant residents alternate every six months; while one works in the histo pathological laboratory of the department and in the dispensary, the other is on duty in the pavilion for private patients, performing the same duties to private patients as the house-officers perform to ward patients; to this private pavilion service are admitted private patients of the chief of the department and of his associates in the service (Drs. Crossen, Gellhorn, Royston, Schlossstein, O. Schwarz and Taussig);

besides these duties the assistant residents act as alternates to the resident, so as to have an admitting officer on duty at all times.

THE UNDERGRADUATE COURSE IN OBSTETRICS.

Since our students enter with two years credit in college work, which must include chemistry, physics and biology, it has been found feasible to simplify the course in the medical school and to devote the first year and the first and second trimester of the second year to anatomy, biological chemistry, physiology, pharmacology and bacteriology.

The next period of two years, that is, from the beginning of the third trimester of the second year to the end of the second trimester of the fourth year, is devoted to the main clinical branches, namely, Medicine, Surgery, Obstetrics and Pediatrics; the specialties are given comparatively few hours and those mostly in the dispensary service.

In this way the prescribed curriculum comes to a close at the end of the second trimester of the fourth year, leaving the last trimester or approximately eleven weeks for elective work; of this elective work not less than 150 hours must be taken in one of the four main clinical branches; the remaining 150 hours or more can be devoted to the specialties.

In the allotment of hours the curriculum committee has tried to keep well within the number recommended in the Model Medical Curriculum prepared under the direction of the Council on Medical Education of the American Medical Association in 1909.

In that curriculum 240 hours were recommended for Obstetrics and Gynecology, exclusive of the time spent in attending labor cases; I find these hours quite sufficient if the course can be properly spread out and balanced; our undergraduate course is divided into a Junior Course and a Senior Course of 121 hours each, and each course lasts exactly one year.

If at the end of these two years a student has failed to get a passing grade, he has the last trimester of the fourth year left for the removal of conditions.

THE JUNIOR COURSE.

This course consists of seventy-seven hours of recitations, twenty-two hours of laboratory work and twenty-two hours of exercises in diagnosis, besides considerable practical work in the dispensary during vacation between the second and third year.

RECITATIONS.

These are limited to eleven hours during the third trimester of the second year; they are delivered by the chief of the department and an effort is made to interest the student in the subject of obstetrics, to acquaint him with desirable text-books and to stimulate him to do some work during vacation.

These recitations cover the anatomy and physiology of the female organs of generation and the fertilization and implantation of the ovum; they serve as an introduction to the recitations given in the first and second trimester of the third year, when forty-four recitations, two a week, deal with the physiology of pregnancy, labor and the puerperium, during the first trimester, and with the pathology of these conditions during the second trimester; while twenty-two recitations deal with the essentials of gynecology; time is taken out of the hours for recitations in the second half of the second trimester for practicing forceps deliveries, versions and pelvic end extractions.

THE LABORATORY COURSE AND THE COURSE IN DIAGNOSIS.

For these courses the junior class is divided into three groups; each group takes these practical courses in a different trimester. Twenty-two hours are devoted to laboratory instruction in obstetrical and gynecological pathology; the remaining twenty-two hours are devoted to exercises in obstetrical diagnosis; points in history taking are discussed; the student is drilled in pelvimetry; in inspection, palpation and auscultation of the pregnant abdomen and in pelvic examinations; he must be able to convey his findings to paper and make a correct obstetrical diagnosis; he acts as witness in the delivery rooms and studies puerperal involution and the changes in the new-born in the wards. At the end of this course the student is subjected to a practical examination, and he is not allowed to take up the senior work until he has proven his qualification. Both of these practical courses are given by the one instructor, who is on a salary; he is assisted by members of the house-staff.

THE SENIOR COURSE.

This course consists, first of all, in the attendance of cases of labor under supervision; groups of four students live in the obstetrical out-service quarters throughout the year; this service is especially active during vacation, so as to provide students with the necessary

credits for practical work, without taking them away from other schoolwork; each student is required to attend fifteen cases of labor and to take care of the puerperal woman and her baby for two weeks or longer; the number of required cases has been raised from ten to fifteen, because the State of Pennsylvania requires that candidates for admission to practice have delivered at least twelve women. Our classes are still so small that many ambitious students deliver thirty or forty cases and more; the time so spent is not included in the 242 hours of the curriculum.

During the session the senior class is divided into three groups, of which one group is on the medical service, another on the surgical service and the remaining group is split into two sections which are rotating between the obstetrical and the pediatrical service.

The obstetrical section, composed of one-sixth of the senior class, thus changes every five and one-half weeks; during that time the group works on the hospital service from nine to twelve every day of the week; this constitutes ninety-nine hours of schoolwork in the curriculum. The students now act as clinical clerks; they are assigned cases and work them up under the guidance of the housestaff; they participate in the ward rounds; assist in the operating rooms and attend cases of labor; in fact, they participate in the entire work of the hospital and are expected to look after their patients after school hours and on Sunday just the same as their teachers must do; they reside during these five and one-half weeks in the obstetrical out-service quarters; receive additional instruction on the manikin and are given such a prolonged practical test and examination that this part of the course may well be compared to the German "Staatsexamen."

During the first and second trimester of the fourth year the entire senior class meets the chief of the department once a week in the clinical amphitheater from twelve to one o'clock; this hour is filled by clinical lectures and demonstrations on obstetrical and gynecological topics. These twenty-two hours bring the senior course up to the 121 hours of the curriculum and serve the very good purpose of keeping the classes under absolute control to the end of their two years' course in obstetrics.

The Dispensary and the Hospital Service and the Undergraduate Instruction does not exhaust the activities of the department; there is a beginning of graduate instruction; there is the instruction both practical and theoretical to the students in the Department of Nursing; there has recently been instituted a six months course in obstetrics for registered nurses with proper educational qualifica-

tion to fit them for missionary work in country districts, in the hope that they may serve as instructors and advisors to expectant mothers in thinly settled regions; there also remains the great obligation of providing time and facilities for original work to the large number of volunteer workers in the department, who have a right to expect such recognition for their unselfish devotion to the cause of medical education and research

DISCUSSION.

DR. HERMAN E. HAYD, Buffalo, New York.—It is unusual to have a paper of this kind presented before this Association. It has been very interesting and instructive to us, and I agree with our president, Dr. Pantzer, that this is what we hope to come to, and from what Dr. Schwarz has stated you can see what a wonderful institution he has in St. Louis. He evidently keeps in touch with people who are inspired with the right kind of feeling for humanity.

LYMPH GLAND EXTRACT. ITS PREPARATION AND THERAPEUTIC ACTION.

BY

DAVID HADDEN, M. D., F. A. C. S.,

Oakland, Cal.

THE *Archives of Internal Medicine* for July, 1914, contained a paper by Dr. R. A. Archibald and Dr. Gertrude Moore entitled: "A Preliminary Report on the Production, Action and Therapeutic Effect of Leukocytic Extracts."

The leukocytic extract referred to in this article is prepared by a digestive process from healthy leukocytes. It differs from that obtained from inflammatory leukocytes by the method of Hiss and Zinser, in that it is of much more condensed bulk, is more stable and dependable, of far greater efficiency and very reasonable in cost. In the majority of cases, a subcutaneous injection of 2 c.c. gives, after a short interval, a marked increase in the multinuclear leukocytes. This leukocytosis reaches its height in about eight hours. If given intravenously, the height of the leukocytosis is reached in about three hours, though the effect obtained is more transient.

There is no sensitizing of the patient, nor have we noticed any objectionable symptoms. When used in acute septic conditions, with a high leukocytosis, the phenomenon produced is one of steady and gradual decrease, with rapid amelioration of all symptoms.

For some time preceding the publication of Dr. Archibald's and Dr. Moore's paper, the use of the Archibald-Moore leukocytic extract has been a matter of almost a routine in my surgical cases of septic origin; and by my associates, it is largely used in all types of infection. In my practice, the cases of acute septic appendicitis, especially, have run a much more rapid convalescence, and, as a rule, are completely healed within two weeks.

I feel justified in stating that in the majority of all septic cases, in my practice, the severity of the attack has been decreased and the rapidity of convalescence increased.

We have used in several cases of streptococcemia the magnesium sulphate solution advocated by Harrar. The magnesium sulphate

solution alone produced no leukocytosis, but used in conjunction with leukocytic extract, a marked leukocytosis resulted of a more profound character than the extract alone produced. These patients recovered.

About three years ago, Dr. Archibald and Dr. Moore began experimental work with a lymph gland extract. The technic of the preparation follows much the same method used in the production of the leukocytic extract, and is as follows:

"Lymph glands are obtained from healthy bovines, ground, diluted with sterile distilled water and exposed to a temperature of 58° C. for one hour. They are then placed in the incubator at 37° C. and autodigestion is allowed to proceed until a definite amount of digestion has taken place. The point at which digestion is stopped is arbitrarily fixed by the blood pictures produced in guinea-pigs and other experimental animals including humans.

"When digestion has proceeded to what it is deemed the proper stage, a preservative is added, the preparation is filtered first through filter-paper and then through a number one Berkefeld filter, following which it is tested physiologically, bacteriologically and chemically. Any extract so produced that does not show definite blood changes when injected into experimental animals, is discarded. In other words, if an extract does not produce over 100 per cent. increase in the total leukocyte count and a corresponding increase in the mononuclear leukocytes, it is abandoned."

In the preparation of both the leukocytic and lymph extracts, there is a period of digestion reached at which point the maximum therapeutic effect is obtained. It has been found much easier to determine the necessary degree of digestion in the case of lymph gland extracts, because of the relative constant cellular content of the glands used. In dealing with blood, the cellular content naturally varies with the stages of the physiological functions in progress in the animal, so there is no easy way, at present, to determine the proper time to discontinue incubation. The correct stage is reached by withdrawing a proportion of each batch at stated intervals and testing out the separated portions on guinea-pigs. In case the preparation does not come up to a certain standard, that batch is discarded. Digestion carried beyond a definite point will always result in a complete loss of physiological action in both the leukocytic and lymph extracts. In the lymph gland preparation the time element of digestion can be depended upon. Both preparations are required to give 100 per cent. increase in the total leukocyte count.

That the physiological effects of the leukocytic and the lymph gland extracts are not due to the protein content is evident from the

fact that a 2 c.c. injection contains less than 0.04 of 1 per cent. of protein. It takes twenty times as much protein as each dose contains to produce any changes in the blood picture in the guinea-pig.

While the leukocytic extract produces a marked increase in the polymorphonuclear leukocytes, the lymph extract invariably produces an increase in the lymphocytes, especially the small lymphocytes, and the blood platelets.

The effect of the blood platelets increase is a rapid and marked increase in the coagulation power of the recipient's blood. In guinea-pigs used for standardization, one injection produces such a decrease in coagulation time as to make difficult the blood countings through the almost immediate solidification.

We have found that in normal human beings the coagulation time is markedly decreased with the first dose. Cases with abnormally slow coagulation time show marked results, even following the primary injection, though, as a rule, a dose for three succeeding days produces the greatest effect, therapeutically. The period may be reduced to even ten seconds and this effect will persist for three or four days.

One case presenting severe uterine bleeding, in which the pelvic pathology had been corrected, had a delayed coagulation time. The bleeding in this patient was not influenced by any of the drugs producing contraction of the uterine muscle, but in time an improvement resulted from prolonged antispecific medication instituted upon finding a 60 per cent. positive Wassermann. This patient's coagulation time was fifteen minutes by the capillary tube method. She repeatedly presented the phenomenon of a sudden cessation of bleeding within fifteen minutes of the initial lymph gland extract injection at each menstrual period. Within twelve hours the flow would again appear in moderate amount. The menstruation was kept within normal limits with a daily dose for three successive days. Several times a premenstrual treatment of three doses was instituted and no excessive bleeding occurred. The only subjective symptom this patient ever noticed following the injections was a "board-like feeling of the head" as she expressed it. The objective sign present was the prominent appearance of the cervical and facial veins for about half an hour, but with no increase in blood pressure.

I have used the lymph gland extract in a number of cases of similar nature where the bleeding was due to slow coagulation time of unknown origin. The pelvic organs were free from abnormality or had abnormalities not accountable for hemorrhage.

Two cases of easy bleeders, one with hemorrhage from the ab-

dominal incision, the other with free oozing from the mucous membrane, had a complete and permanent cessation of the bleeding almost immediately following the one dose.

I have been interested in the fact that in some cases an aphrodisiac effect followed a series of injections, and so have tried it in a few cases of sterility, but so far I cannot express an opinion.

My associates have been using this lymph gland extract in cases of hemophilia, pulmonary hemorrhage and tonsillar bleedings with very favorable results. It has replaced, in our hands, horse serum and fresh blood, and by two men is used as a prerequisite to tonsil operations. In operations done preceding or during the periods, or cases in which much oozing is to be expected, I use it as a preparatory injection, given twelve hours or so before operation or immediately following operation if I fear any possibility of excessive oozing. I am rather inclined to feel that while the functions of certain glands are stimulated, the exudate from serous surfaces is diminished.

In another class of cases I have used the lymph gland extract rather extensively, but these cases are of the type that make it difficult to speak with authority as to the therapeutic results.

About eighteen months ago, having in mind the infectious granulomata theory of sarcoma, I reasoned that the character of the tissue involvement might more readily be influenced by a therapeutic agent that would increase the lymphocytes, so I began the use of the extract in a case of tumor of the cecum responding to the Abderhalden test for sarcoma. This patient, when first seen, had an excessively tender mass in the right iliac region, so much tenderness being present that she could not even turn over in bed without supporting the side. A daily injection of 2 c.c. for about a period of ten days resulted in a marked increase in the size of the tumor and a disappearance of all tenderness. After about twelve doses she complained of some headache, and at her request, the injections were discontinued. Seeing the case only as a consultant, conditions arose which prevented further administration.

Naturally, the treatment of any malignant growth by such measures resolves itself into two methods of application: One as a prophylactic following surgical removal; the other as a palliative in the cases of inoperable type. The first method naturally can give us no immediate information as to the value of the therapeutic measures employed. In the cases of inoperable type, the notorious tendency of all malignant growths to periods of lessened rapidity of growth, and improvement of symptoms lays one open to the liability of crediting temporary improvement to the type of medication used.

I have used, during the last two years, lymph gland extract in all inoperable cases of carcinoma, and discounting fully the possibilities of spontaneous improvement, I believe I am justified in the conclusion that the effects have warranted the use of the extract.

The patients themselves have in most cases acknowledged that they felt stronger and in better spirits, and, as a rule, were eager to have the injections continued. In most cases the growth has decreased somewhat in size, and any associated inflammatory overgrowth has subsided.

Upon one case of carcinoma of the pylorus with practically complete obstruction, I did a posterior gastroenterostomy. This patient has lived one year, eight months of which was given to active physical labor. The operation showed all the mesenteric glands extensively involved, the original tumor mass being the size of a large orange. The growth decreased more rapidly in size than could reasonably be expected as a result of the adventitious opening, so that for months it was barely palpable even through thin abdominal walls. Periods of considerable length intervened from time to time in which the injections were discontinued as the patient was away from home, and even though he carried the extract with him, neglected its use. During these intervals, the growth increased in size and the stomach symptoms became evident. The increase of weight from 90 to 142 pounds can, of course, be accounted for by the ability to take food.

This case is typical of several others of similar type in which improvement seemed to be definitely associated with the periods of treatments.

Dr. R. S. Leachman of Vallejo, California, reported to me the results in one case of inoperable pelvic carcinoma in which, at my suggestion, he had used the extract. This case had an exploratory incision done a short time before the lymph gland extract was begun and it was found that the bladder, uterus and rectum were involved. The bladder and rectal symptoms were extreme, and the loss of blood marked.

Dr. Leachman reports "that the bleeding promptly decreased and during the last three weeks of the illness completely disappeared. The size of the mass decreased fully one-third."

"I am convinced," he says, "that the lymph gland extract did help the patient locally very much. Pain was less and pus and blood entirely relieved. The family also think the relief was marked."

The dose has been fixed by Dr. Archibald and Dr. Moore at 2 c.c. daily, because of the character and definiteness of the blood change resulting. I have, however, been using it in cancer cases as freely as

10 c.c. daily. In some cases the 10 c.c. dose produced some headache and restlessness, so that recourse was had to 4 c.c. twice daily with no untoward symptoms resulting. We did not find that the blood changes varied in any marked degree over those produced by a 1-ampule dose. There was no evidence in any case of protein reactions or sensitization of the patients.

While with me the use of the lymph gland extract in malignancy has been entirely theoretical, the work of the late Dr. J. B. Murphy, of Chicago, would give one some basis of fact and with his work in mind we hope shortly to take up the laboratory experimental work on animal tumors.

Accurate work on the influence of these body extracts upon ovulation ought to be possible on account of the work the University of California Anatomy Department is doing in the determination of the exact ovulation cycle in rodents.

We probably will never use body extracts in operable cases of malignancy as a substitution for operation, but if proven of value in animal work, it will have its place as a prophylactic. In inoperable cases, it gives us one method that undoubtedly prolongs the patient's life and relieves many of the distressing symptoms, so that the amount of opiates necessary is lessened, but above all it puts in our hands an ability to make the patients really feel something is being done for them.

The present important field for the lymph gland extract is, however, undoubtedly in cases of hemorrhage, and especially so in patients whose blood changes result in lowered coagulability.

Dr. Archibald and Dr. Moore are anxious to see the extract tried out more extensively in tuberculosis and other chronic infections for they feel that their laboratory experimental work has demonstrated its effect in these cases.

DISCUSSION.

DR. JAMES E. DAVIS, Detroit, Michigan.—I would like to ask Dr. Hadden what his theories are in regard to the chemistry of the platelets, and in using the lymph gland extract just how these platelets are produced. I believe we have a number of theories. Some have believed that the platelets have nothing whatever to do with the coagulation. Others have brought up a discussion as to just what the platelets are. Are they fragmentary portions of the lymphocytes? This is an interesting line of speculation, and I wonder whether light has come to Dr. Hadden in these particular instances of the platelets.

DR. DICKINSON.—I would like to know how many cases he had investigated before he came to these conclusions?

DR. HADDEN.—Personally, I cannot express any opinion as regards the function of the blood platelets. However, they are so markedly increased, that much of the space in between cells is filled up with them and we have assumed that they are the cause of the decreased coagulation time. Dr. Moore feels she has proven conclusively, although as yet unwilling to accept this evidence absolutely, that we are dealing with an enzyme and that the presence of this enzyme produces these changes.

While I was in Rochester, Minnesota, I had an interesting talk with Dr. Luden and Dr. Kendall on the chemistry of the thyroid and the probable chemistry of this extract, and they felt we were dealing with an enzyme.

So far as the number of cases is concerned, I will say that I have used this extract in six cases of inoperable carcinoma and sarcoma of the abdomen. In malignancy I have not tried it outside of that field.

Thanks to Dr. Moore and Dr. Archibald, I have with me some of the lymph gland extract, and if any of you wish to try it I shall be glad to give it to you, also if any of you care to take up any experimental work, Dr. Moore and Dr. Archibald will gladly supply you with what you need.

OBSERVATIONS ON BLOOD PRESSURES DURING OPERATIONS.

BY

CHAS. W. MOOTS, M. D.,

Toledo, Ohio.

(With two illustrations.)

IT has been a custom of mine, when visiting various clinics, to obtain from those in charge their ideas of blood pressure. For a number of years this subject has appealed to me as one of great importance and interest. During this time of study and observation, I have been greatly aided by close association with Dr. Stone, who has already brought the matter to the attention of the profession by well-written articles; also by my anesthetist (Dr. McKesson) who has charted for myself and other surgeons more than eight thousand cases, taking the blood pressures, pulse and respiration every few minutes during each operation.

There is one point with which I am always deeply impressed, after observing the attempts to record pressures at different clinics, and that is this: There seems to be an utter lack of uniformity of technic in taking the readings as well as inability to interpret the readings taken. At some of the most renowned teaching centers we have been much surprised to note that readings were taken only of the systolic pressure, and this by individuals whose lack of professional training prohibited all possibility of any intelligent idea of myocardial, endocardial, or vascular changes, or the relation of these changes to pressures. It has seemed to me, therefore, that it might not be a waste of time for this association to consider certain aspects of this subject, and I make bold to start with a more or less elementary, yet what I believe to be a necessary, discussion of the different pressures which we have found to be important. In this discussion, I purposely omit reference to the effect of respiration and pulse rate on the pressures in order to avoid confusion.

Diastolic Pressure.—This may be defined as the pressure existing in the artery under observation during the diastolic pause just preceding the succeeding cardiac systole. Taken alone, it is the truest index of the arterial tension. No matter what the systolic pressure may be, if the diastolic is high, there is a true hypertension of the vessels; and conversely, if the diastolic is low, we are dealing with hypotension, and this is true irrespective of the systolic pressure.

Pulse Pressure.—This is defined as the force necessary to *move* the column of blood in the artery. It represents the force exerted by the contracting ventricles in excess of the diastolic pressure.

Systolic Pressure.—This is the sumtotal of pressures existing in the artery under observation during cardiac systole. In other words, it represents the diastolic pressure plus the pulse pressure, and shows the energy being expended by the myocardium at a given

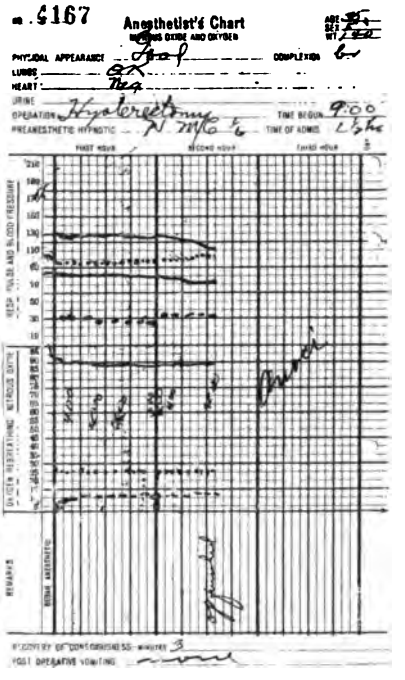

FIG. 1.—Case 4167. Shows perfect blood-pressure picture during an hysterectomy done under complete anociation.

moment. It is, therefore, very variable depending much upon requirements, and the ability of the heart muscle to meet these requirements. It varies even from psychical disturbances, being influenced by many emotions, such as anger and fear. Physical exertion or stress may also affect it markedly. From this great susceptibility to variations, one easily concludes that taken alone it is not nearly so important as the diastolic. However, when compared with the other pressures, it is invaluable as it clearly shows one the endeavor that the heart is making to maintain circulatory equilibrium.

The Pressure Ratio.—Briefly stated, I mean by pressure ratio, the percentage obtained by dividing the pulse pressure by the diastolic pressure. Take the systolic and diastolic pressure, and then find their difference which will be the pulse pressure. You then have simply the following problem: "What percentage is the pulse pressure of the diastolic pressure?"

For example, let us assume that a normal case has a systolic pressure of 120 mm. and a diastolic of 80 mm. The pulse pressure is

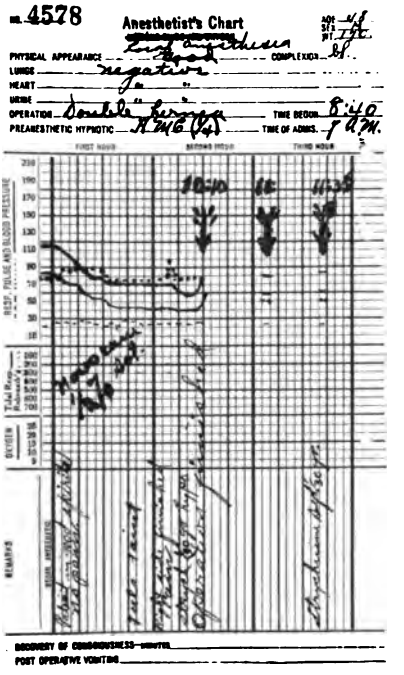

FIG. 2.—Case 4578. Shows blood-pressure picture during great shock under local anesthesia only, for double herniotomy.

the difference between these two which is 40, and the ratio of pulse pressure to diastolic is $^{40}/_{80}$ or $^{1}/_{2}$, which means 50 per cent. of the diastolic pressure. We have found in our experience that this pressure ratio is really the *sine qua non* of the whole matter, as it expresses "the relationship existing between the kinetic energy expended by the cardiac contraction in moving the blood column, and the potential energy stored in the arterial walls and column of blood which they contain." (Stone.)

Our experience also leads us to believe that the ratio may be

normal between the limits 40 and 60 per cent. If your case has vascular contraction and rigidity, as shown by a high diastolic pressure, but has a compensating heart that is pushing the blood to the periphery, as shown by a corresponding rise in the systolic, so that the pulse pressure remains near the 50 per cent. ratio to the diastolic, you need have no fear in proceeding with a needed surgical operation. If, however, the pressure ratio is low, say 20 per cent., and taking into consideration the probable presence of acidosis or other toxemia, it is wise to offer a grave prognosis. On the other hand, if the pressure ratio is greater than 80 per cent., the prognosis is at least equally grave, as one may look for little cardiac reserve force because of overwork already done so that slight shock becomes very grave.

Technic.—I think it is now generally conceded that the auscultatory method should entirely supplant the palpatory. We have used the former method exclusively for the past six years and find it quite satisfactory.

The diastolic pressure especially is much more readily obtained by this method.

We have our apparatus so arranged that it is an easy matter for Dr. McKesson to keep his own records while giving the nitrous oxid-oxygen, which is our routine anesthetic. The reading dial, which is 8 inches in diameter in order to render it the more easily observed, is placed on a stand which also contains record sheets. The stand is immediately to his right and answers for a writing desk. By having the rubber tubes of sufficient length to connect the reading dial with the arm band, and the Bowl's stethoscope over the brachial artery to the ear pieces, he has no difficulty in making the frequent observations which we believe to be most important, and which offers the earliest symptoms of trouble. By using this "barometer" we are able to forecast the approaching storm long before it can be determined by any other method and thus get our boat to shelter. Everyone here knows how notoriously inefficient is the treatment of shock when once profoundly established, and if anything is to be done it must be recognized and the proper course instituted before the heart is exhausted by rapid contractions in its attempt to hold up the blood pressures. "Unvariable pressures during operations are the result of most painstaking technic on the part of the surgeon, anesthetist, and every one concerned in carrying out a shock-free technic. Such results cannot be obtained by accident, but it is necessary to eliminate certain procedures peculiar to the individual surgeon and anesthetist, which by means of proper

blood pressure readings are found to be frequently productive of more or less disastrous results either at the time, or during the few days succeeding the operation. For example, no surgeon is willing to admit that he is rough in the belly, and no anesthetist rushes into print with the admission that he generally overdoses his patients, but a series of cases where the blood pressures are frequently taken in each case, will commend or condemn their technic most emphatically. If circulatory depression frequently occurs, even in minor degree, it is due to faulty technic and the cause should be discovered and removed; it may necessitate an entirely new technic in several particulars" (McKesson).

Having made observations and records of the pressures in 98 per cent. of our cases for the past eight years, we have, as a result of our experience alone, come to certain conclusions which I wish to offer at this time.

1. The systolic pressure alone is of very slight, if any, value.

2. The diastolic pressure alone is of much more value than the systolic alone.

3. The pressure ratio is the essential factor, and offers the earliest danger signal.

4. There are certain elements in technic which have marked and constant effect upon the pressures. These are as follows:

(*a*) The psychical or emotional state of the patient.

(*b*) The position of the patient upon the table, the extreme Trendelenburg being the worst.

(*c*) Overdosing by the anesthetist.

(*d*) The amount of traumatism inflicted by the actual operation, such as cutting and tearing the tissues with scissors, the hands, and other dull instruments; the packing of large gauze packs, instead of rubber tissue, into the abdominal cavity.

(*e*) The preservation of the fluids in the body up to the hour of the operation, this being absolutely necessary to maintain the usual pressures.

DISCUSSION.

DR. R. R. HUGGINS, Pittsburgh, Pa.—I regard this paper as one of the most important contributions that we have heard at this meeting. It leads the way to a final solution of the current estimate of a patient's resistance previous to operation. Our studies have led to the conclusion that the changes in pulse pressure which occur in an impaired circulatory apparatus after exercise are most important aids in the determination of the strength of the heart muscle. I am glad to have heard this conclusion because we have

been quite confident that it is true for some time. Patients with either extremely high or low blood pressure may be very poor risks. For several years we have been using spinal anesthesia. I have often been asked for an excuse in its use. It is this. There is no form of anesthesia which will conserve as much energy as spinal. The heart is given absolute rest throughout the anesthesia. The whole splanchnic area is put out of commission and most of the blood lies quiet in the large vessels of the abdomen. Instead of heart strain which is produced by all forms of inhalation anesthesia, there is the most profound rest that may be given to that organ.

DR. J. HENRY CARSTENS, Detroit, Michigan.—I want to commend the work of Dr. Moots in calling our attention to the great value of knowing the blood pressure. If you have a patient with a blood pressure of 170 or 200, it is dangerous to operate. The same holds true with a patient who has an abnormally low blood pressure. It is dangerous to operate until the blood pressure is raised.

I am glad he has emphasized the question of local anesthesia and also the mental viewpoint of the patient. Patients who are exceedingly nervous have blood pressure run up on the slightest provocation. It is very essential to get these patients as quiet as possible, and in the morning, when you operate, you want to keep them busy, and by the time they are ready to be taken to the operating room give them $\frac{1}{4}$ grain of morphin, with $\frac{1}{120}$ grain of atropin. This, when given twenty minutes before operation, has a wonderful effect in stimulating them. It gives them courage. It is like a good drink of whiskey, it stimulates a man to fight. These little things count in connection with our work. If we take the pulse pressure during the anesthetic we will have less trouble than we have previously had in these peculiar cases that are on the border line.

DR. GORDON K. DICKINSON, Jersey City, New Jersey.—It is a sad comment on surgery as we know it to be, not the surgery of the men in this Association, but surgery as it exists to-day, when cases are brought into sanitaria and hospitals with dubious superficial diagnoses, hastened to the operating room and carried through without sufficient after-watching and care.

I am glad that we have had a paper, not on the technic of operation, but one on searching out the vitality of patients before operation. I wish we could know just where the doctor obtains his apparatus, and all about it, so that we may apply it in our own clinics. There are many blood-pressure machines on the market, and much has been incompetently written from a laboratory standpoint, but we can no more comprehend some of the books on blood pressure than we can our books on bacteriology, because we know little or nothing about technic or culturing. We should have this thing made practical to carry home and use to advantage.

I am very glad to have heard from the doctor and hope he will speak again so that we will be able to gather more important points.

DR. MOTTS (closing).—I am certainly not unappreciative of the kind remarks that have been given me on this paper. I assure you, gentlemen, it has covered an experience of about ten years of pretty

hard work. I only hope that I have inspired each of you men, every one of you, to go home with the determination of taking advantage of this means which I believe to be the best criterion to measure a patient's resisting power. I have saved a number of lives by shortening the operation at the suggestion of my anesthetist. I hope that we will quit talking about systolic blood pressure alone; it is of very little importance taken alone. However, the *pressure ratio* is exceedingly important from the standpoint of the surgeon.

As to the apparatus, it simply consists of a bulb, and you may use the ordinary Tycos dial instead of the large one, and have the rubber tubes long enough to run from the patient's arm back to the anesthetist and have a Bowl's stethoscope disc fastened to the brachial artery with an elastic band.

DR. SCHWARZ.—Where do you get these large dials?

DR. MOOTS.—I cannot tell you, but these dials have no advantage over the ordinary Tycos dial, except the readings are somewhat simplified. Dr. McKesson can furnish all information concerning their purchase.

DR. DICKINSON.—We cannot have a specialist, at all times, to give an anesthetic. The intern must be trained, and the patient watched, and he should attend to the patient and to the anesthesia.

DR. MOOTS.—I am rather optimistic. I believe the average intern to-day knows more about blood pressure than any of us did ten years ago, and I believe you will find the average intern very much interested in taking blood pressures. It is unfortunate if you are compelled to depend for an anesthetist on the family physician who comes in to see that everything goes right. It is equally unfortunate that you are compelled to rely on a nurse as an anesthetist, unless she has been properly trained in medicine, for with her elementary training she cannot comprehend blood pressure in all its relations. I wish to announce that we have just completed a technic by means of which we are measuring the patient's acidosis during the operation, and I hope if we can get a sufficient number of cases upon which to make observations during the next year, I may have something to tell you about our results.

POINTS IN THE DIAGNOSIS OF PELVIC TROUBLES.

BY

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Professor Abdominal and Pelvic Surgery, Detroit College of Medicine and Surgery, Detroit, Michigan.

THE difficulties in making a correct diagnosis of pelvic troubles we all recognize. Let us take the ordinary disturbances of menstruation. To make a correct diagnosis of amenorrhea, for instance, will embrace the whole domain of physiology, pathology, and bacteriology. Amenorrhea can be caused by many physiological disturbances, and almost all bacterial infections, as well as innumerable diseases. If we consider dysmenorrhea, it is by no means a local disease, or a question of mechanics, as its diagnosis will embrace all domains of neurology and hematology. And when it comes to menorrhagia, we find that many cases are constitutional and not local. So that in this one phase of the question, that is the menstrual function, we must cover nearly the whole domain of medicine, and it shows that the gynecologist must have a broad view and understanding of the practice of medicine.

If we now consider other pathological lesions, we often find great difficulties in the differential diagnosis of swellings, tumors, etc. The diagnosis of fibroid tumors is ordinarily easy; but the diagnosis of small uterine fibromata of the submucous variety, causing menorrhagia and leukorrhea, is not very easy, as these tumors remain small for months and years, and can only be detected with great difficulty. A dilatation of the uterus must be made in suspicious cases. This cannot be readily done with steel dilators under an anesthetic, as the uterus must be explored by the finger. In these cases it is best to use a sponge tent, perhaps a succession of tents, so that the cervix is perfectly soft and the uterus can be readily and thoroughly explored with the finger.

Take, again, women in the so-called cancer age, who are suffering from rather profuse hemorrhage, or perhaps some little discharge, we must suspect a development of cancer, and are obliged to curette and examine the tissue microscopically. During the cureting it is easy to miss little cancerous points the size of a pea in one horn of the uterus; and then we are lulled into the belief that no cancer exists.

In these very cases we have brilliant results with early vaginal hysterectomy. Then, again, how easy it is to overlook small polypi in a uterus of about normal size and with a normal cervix, unless we dilate and explore the inside of this organ.

Take a case of pregnancy complicating uterine fibroids. How difficult it is, sometimes, to recognize both conditions, and how necessary it is to make the diagnosis before operative procedures are instituted. Take a case of ordinary ovarian tumor; how easy the diagnosis generally is; and still, how difficult when you have encysted peritonitis of a tuberculous nature.

It is difficult to differentiate an ovarian tumor which follows peritonitis which has produced adhesions between the ovary and tube on one side and where a tumor develops on the other side of the abdomen. You see the case first when the tumor has reached the lower costal margin, and then you do not know whether you are dealing with a hypernephroma, a hydatid cyst of the liver, or a cyst of the spleen on the other side. The vague history you get from the ignorant patient does not help you much.

Take the solid tumors of the ovary, benign or malignant, when they become adherent to the pelvis, the uterus, and the rectum, it is almost impossible to make a correct diagnosis before operation. In fact, after the tumor is out, pathologists cannot always agree upon what is the character of the tumor.

Let us now take up pelvic inflammations, whether puerperal or specific in origin. How difficult is it to determine whether it is a tube adherent either in the cul-de-sac or to one side of it; or whether it is adherent to the side of the bladder or the fundus of the uterus; or whether it is an abscess which has developed along the lymph channels in the cellular tissue, extraperitoneally, working its way down toward the rectum or up in the direction of Poupart's ligament, or back to the crest of the ilium. We recognize the infection, but it is difficult to locate it. When the exudate accumulates in the cul-de-sac the case is easy enough; it makes no difference what it is if we open and drain in this region; but, if it is higher up, not within easy reach and more to one side, an abdominal section becomes necessary, which always has a greater mortality. Still in some cases a prompt operation is imperative, while in other instances it is better to wait until the best point of attack has developed. In these cases the history and the symptoms will often enable us to make a correct diagnosis, and thus avoid error.

Take cases of sterility, where we can detect nothing abnormal even with a good history, how often patients lie to lead us astray. Patients

who have had pelvic troubles and adhesions; closure of the tubes, that we cannot detect by ordinary examinations; and, if in doubt, are obliged to make an exploratory celiotomy to find the cause of the trouble and remedy it at the same time. But, before doing this, how necessary it is to ascertain whether the husband is really potent.

The cirrhotic ovary causes a lot of trouble; severe pain, especially during the menstrual period, and still a physical examination will reveal nothing. Sometimes we can feel even a small ovary; but, when the patient is very fleshy, which is usually the case, it is very difficult.

But the most difficult of all, it seems to me, are cases of pelvic adhesions in women suffering and complaining, and still nothing can be detected. Physical examination indicates everything is in its place. But these patients have pain when standing, and when doing light work, at defecation, or when a little gas distends the intestines. Some of them are very much distressed. I find that, on careful physical examination, these patients have pains when I move the uterus and the pelvic organs in certain directions. If the uterus is pushed to the right, they complain of severe pain in the left side; or when pushed in the opposite direction they have pain on right side. When the uterus is pulled away from the bladder, no complaint is made; but when the uterus is pulled forward, away from the rectum, severe pain is complained of, especially in the back. The pains in these cases I find are due to adhesions; and I believe the adhesions are caused by an infection emanating from the rectum and sigmoid. These patients often suffer from chronic constipation. They are, certainly, the most difficult cases to manage. All the douches, tampons, administration of alteratives, etc., have been of little benefit in my experience. Abdominal section alone, and mechanical means will enable us to remove the adhesions.

In many instances it is difficult to convince the patients that an operation is necessary, because they have always been in seemingly perfect health and never had any symptoms of a pelvic disease until, perhaps, three or four years previous. The trouble since then has gradually increased in severity, so that now the patient has great difficulty in working, walking, and following her usual vocation. I am convinced that there are many such cases where the history is perfectly free from the non-existence of any trouble previously, with a gradual onset of pain and distress, which is very much increased when moving the uterus and the pelvic organs as described above. I would like very much to hear the experience of others on the subject.

In conclusion, I would say: *First.*—Naturally, all pelvic troubles offer difficulties in diagnosis. *Second.*—Adhesions of some of the pelvic organs without menstrual disturbances or palpable changes are very difficult to diagnosticate. *Third.*—Pain on moving the uterus or any of the pelvic organs indicates adhesions. *Fourth.*—These adhesions are probably caused by infection from the bowels. *Fifth.*—These obscure cases require exploratory celiotomy for exact diagnosis and efficient treatment.

CONSIDERATIONS IN THE CARE OF OUR PATIENTS BEFORE AND AFTER OPERATION.*

BY

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Detroit, Mich.

THERE is nothing new in dealing with this threadbare subject, but the author hopes to arouse some interest and perhaps some discussion upon a theme which still needs it.

First of all, I wish to make the patient and her interests paramount; and to that end let us deal with her as we would with a woman and a mother, rather than the case *in Ward No. 2, with uterine prolapse.* Let us have not so much of the routine, but more specific care for a specific case; let us adapt our resources and environment to her, instead of demanding her compliance alone to ours. Patients need more personal attention from the surgeon and less physic and digitalis from the hospital intern. Too much time has been given alone to questions of bare mortality and too little to morbidity, and to the causes of delayed restoration to the normal. We should not alone be interested in the cure of disease and saving of life, but likewise in the relief of pain and psychic influencs, consequents upon operation and hospital environment.

Every surgeon should be a humanitarian. Surgery is a thing of art as well as science; a thing needing a fine esthetic sense rather than mere boldness. It is constructive, not destructive; it is saving life, not taking it, and likewise a surgeon is not he who has boldness, but one who has judgment; not alone he who knows how and when to operate, but also he who knows when to refrain and when to conserve. Crile's microphotographs of the brain cells taken before and after operation, before and after long anesthesia, pain, fear, excitement and exertion, certainly show that each one of the factors has a large part in the recovery of our patients, and should point the way, first of all, to the better preparation before operation.

Elective operations are those which are not strictly emergency operations; they are largely in the majority. We usually have the opportunity of choice, where, when and how the patient should be operated upon, and just here I should say too, that a considerable

number of patients of the true neurasthenic class have been submitted to operation too frequently. Unless she has a definite demonstrable pathology, she should not be considered an operative risk. Many deaths that might have been avoided, have occurred in these patients of low resistance. Those affected by an early Graves' disease, where the thyroid enlargement is not yet apparent, and many children also, who have status lymphaticus, should be eliminated from operative consideration, unless forced upon us through some emergency.

Surgeons have paid too little attention to the internal secretions. Patients do not come to us for operations *per se*, they come to be cured of a malady of which they usually know nothing, and place themselves in our hands, because they have been referred to us by some other physician, who has failed to cure them. We should be exceedingly careful in the selection of such cases. As a rule, they are not given thorough examination—general physical examination, I mean. Every patient should have it. Some of our internist friends are as lazy as we and have not made thorough examination before referring the patient. I am well convinced that the majority of those diagnoses which are not made or are improperly made, are not because of lack of knowledge, but lack of time and proper application; therefore, we see a certain number of patients each year, sent to us for operation, who do not need it, or come at a time when they are poorly prepared for it. Then we have the other class which has definite pathology, which has or has not been diagnosticated before coming—the white-faced emaciated ones, who need rest in bed, rather than the wash-board and scrubbing that have been their wont. The patient needs good food, tonics, rest, etc., before an operation is contemplated. A short time in the hospital for general treatment, adaptability to the new environment, knowledge of the surgeon's personal care of her, and the assurance that she will make an early recovery, certainly have their good results.

PREOPERATIVE CARE.

In general, we have been giving all our patients more preoperative care than formerly, and less rushing to the hospital and hurried operation. For two or three days, we feed them well on easily digested nutritious foods; the last day we give 6 ounces of water each hour while awake; this fills the blood-vessels, increases kidney, liver and skin excretions and secretions. Nervousness and loss of sleep are exhausting, and should be met by such remedies as the usual sedatives

or opium. I think it imperative that the patient be given sufficient quantities of opium to induce sleep. A patient who is permitted to lie awake all night to meet perhaps one of the crises of her life the following day, is in poor condition to put up the necessary defense. We would not care for a team of plow horses that way, if we expected a full day's work from them on the morrow. We teach our nurses to be cheerful to our patients, and perhaps we also act in accord with them, but how little that interests the woman or man who has lain awake for two nights, thinking of operations or perhaps "the great divide."

As to clearing out the alimentary canal, we are heartily in accord with Doctor Baldwin. The patients should be given an active cathartic twenty-four hours or more before the operation. Castor oil is without question, we believe, best, since it sweeps out the entire bowel, producing a minimum of griping, and its action is complete before the night comes on, when we may need to administer opium for sleep. Unless the patient is to have a rectal operation, enemata of any description on the morning of the operation are contraindicated. What we want is intestinal rest. Enemata produce retroperistalsis, and it is often many hours after one is given before the last part of it is expelled. In our hands, this preoperative treatment has been indescribably better than the old days of compound cathartics and injections.

On opening the abdomen, the intestines are found empty and asleep, and I believe this is a decided prophylactic to later abdominal distention. We are convinced that our cases have been more comfortable in their early convalescence, and have yet to see the first case in which we regretted not having given an enema. One hour before the operation, a small dose of morphine and hyoscin is given subcutaneously; less mucus is secreted in the throat and trachea, and the patient takes less anesthetic. In general, we like gas and oxygen, combined with a little ether; it is less discomforting to the patient, followed by little or no nausea and vomiting; lessened thirst and immediate return to consciousness. It is an unusual thing to have the pulse affected by even long administration. At our hospital, we employ a skilled anesthetist, one who has prepared herself by many months' application in the technic of gas administration. Gas *is* dangerous in the hands of a novice, so is ether, so is chloroform.

All operative cases, especially abdominal ones, should have the benefit of laboratory findings. Our plan of attack has often been changed after we have reviewed these reports. Many operators think lightly of the reports from the laboratory; we feel that they

are one of our instruments of precision, and while we do not let them outweigh all else, still the laboratory has its definite place; it is indispensable, and when we become negligent in asking for all it can give us, we often find it to our disadvantage. This is particularly true in reference to blood findings.

OPERATIVE CARE.

The pendulum swings in surgery as in everything else. The thing we adopted yesterday we condemn to-day. So much for progress.

As regards abdominal surgery, we have learned that the viscera and their coverings speak in no uncertain manner, and to some extent we have learned their language, and, therefore, after an operation, some of them cry out by expressions of pain; some by way of abdominal distention; some by way of vomiting; some by thirst; some by pallid skin and sunken eyes; but the meaning of it all is, that we have given insult. One's insides were never intended to play ball in; but if, perchance, the ball has gotten in, our duty is to get it out as quickly as we can, with gentleness and safety. We have been taught by this language, that we must get in and get out; that we must make openings large enough to see that which we cannot feel; that we must do the least handling possible to accomplish results; that we should avoid forcible retractions, and when we seek to pick up bleeding points, pick them up separately, instead of insulting all the adjacent tissues; that warm moist gauze, used gently, is less offensive than dry gauze, used roughly. In brief, if one desires to tame a vicious animal, don't try to do it by way of teasing him. Permitting the intestines to be exposed to the air more than absolutely necessary, or to have them come in contact with the abdominal wall which has been prepared with iodine, to make traction upon the mesentery; to permit too many hands in the operating wound, all these and many more are certain factors in the production of that symptom-complex, we call shock.

During the last two years, since we have been giving more attention to preoperative care, and handling other peoples' intestines as we would like to have them handle ours when needs be, the factor of shock has been singularly absent. I heard Doctor Mayo once say, that anyone who would take advantage of their patients merely because they were asleep, and would pinch, pull and rub their exposed tissues needlessly, is a coward and a knave. I am convinced that surgeons are careless of nerve endings and splanchnic stimula-

tion, beyond what they would be were the patient conscious. Of all men who should be gentle and careful in the process of his work, it is the surgeon. It is well to know what shock is; to combat it when present, but how much better to be able to avoid it.

POSTOPERATIVE CARE.

The handling of patients should vary in accordance with their psychology and the nature and severity of the operation. In all operations of gravity, we use the Murphy drip, with bicarbonate of soda and glucose, as soon as the patient is returned to her bed. The soda will overcome the tendency to acidosis, the glucose furnishes an easily absorbable carbohydrate, and thus supplies energy. In those who through accident lose much blood or who sweat profusely, the giving of two pints or more of this solution, relieves the distress of extreme thirst, and overcomes tendency to shock. This is a harmless measure, giving little discomfort to the patient, and supplies her with water and food when her tissues have need of it. If the presence of a small rectal tube is annoying to a nervous patient, we then give 4 to 6 ounces of the same solution at one time, at intervals of three hours. We think this is a most valuable remedy, especially when administered early; thirst is not so severe, and the secretory organs, which are inhibited by long anesthesia, are made active. We desire to get liquids and food into our patients as soon as consistent with the circumstances. Thirst and nausea are disturbing factors, and when our patients call for water, we usually permit, in small quantities frequently repeated, hot tea or hot water, after the first two or three hours. If this is returned, then she is given as large a drink as she can be induced to take, and when this is returned, all liquids are prohibited by the mouth, until she is free from nausea. A stomach tube is seldom necessary, but occasionally becomes a valuable instrument in severe cases. Medication by the mouth has been found useless. Severe and long-continued nausea is sometimes relieved by a 3-grain opium suppository, repeated if necessary, until the stomach has been put at rest for a few hours. In our experience, it has acted better than morphine or codein for this purpose, especially so when the operation has been pelvic. I think some of these patients by the distressing experience of continued nausea and vomiting, become nervous and hysterical, and a dose of chloral and bromide per rectum is sometimes efficacious. Occasionally a patient dies from exhaustion.

No operation is entirely free from danger. We often advise operation, but only under special conditions do we urge it. We never have seen the persistent and sometimes serious vomiting, following gas and oxygen that is so common with ether or chloroform. Pain, when severe, should be controlled by codein, given subcutaneously. It does hot inhibit glandular activity. To be sure, the quantity should be curtailed as much as possible, but we think it is a wrong principle to allow patients to suffer with pain and fret for hours. Codein does not induce habit easily; it is more easily withdrawn than morphine, and in general produces less gastric distress, or bad dreams. I am a firm believer in large doses of anything that will control motion and sensation in the presence of a soiled peritoneum; motion is provocative of pain in any acute condition, and especially so in the bowel. Therefore, in peritonitis, we believe in the free use of opium to limit motion and maintain physical and mental rest. We prefer to have our patients bordering on unconsciousness for forty-eight hours by its use.

If we knew all the exact factors that cause abdominal distention, we might more easily combat it. Distention is often severe when there is no pathology in the abdomen, as a severe concomitant pneumonia, a stitch abscess, or operations following inguinal hernia. We occasionally have no meteorism following a severe abdominal or pelvic operation, which has been attended by much handling and considerable exposure, but such cases are rare. The writer feels that rough handling and long exposure of the viscera to air and foreign bodies, or pulling upon the mesentery, or the grasping of masses of tissue in the effort to get a single bleeding vessel, are likely to stimulate the splanchnics and induce paralytic ileus. The liberal use of sponges, and especially dry ones, is a pernicious practice in this respect.

The sole purpose of this paper is to focus thought on this point, not on the question of distention *per se*, but the factors which produce it.

I was surprised to read in the transactions of last year, that part of Doctor Reder's paper, in which he said, "Our later knowledge of preoperative care and general surgical technic, had not decreased postoperative abdominal distention." I wish to say, with all the emphasis at my command, that that part of his otherwise splendid contribution is wrong. As nature abhors a vacuum, so does she also the handling and exposure of those sacred precincts that were never intended even to be seen, and when we frustrate her plan she balks and her whole sympathetic system speaks to us in no uncertain words,

and one of these is distention. Therefore, the most important feature in treatment of this symptom is prophylaxis.

Gas pains following operations are by far the most distressing to the patient of anything she has to endure. A few die each year as a result of bowel inertia. If there be no contraindication, we endeavor to induce bowel movement on the second day by means of magnesium sulphate or castor oil given either by mouth or by rectum. The use of a rectal tube allowed to remain *in situ* for some time, is often beneficial. Medication by mouth is disappointing. After a day or two, when food can be retained, occasionally bread crusts and coarse stale bread with butter will often induce peristalsis. We have not found any single remedy to be of universal good. Pituitrin has more nearly reached that place than any other. Eserin, even in large doses, as recommended by Craig, has been disappointing in our hands.

The use of alum water, turpentine and asafetida per rectum are routine remedies. I have never used the Kemp's tube, as recommended by Dickinson. We often see the expression in medical periodicals, "the high rectal injection." If by that they mean that the rectal tube is passed through the rectum and sigmoid into the colon, then the expression is erroneous, for rectal tubes cannot be made to reach this area.

In closing, I wish to leave these thoughts:

1. Our patients are entitled to more preoperative and postoperative care than they have been receiving.

2. Patients suffer from shock by long anesthesias, exposures and rough handling of tissues.

3. Surgery is a thing of art and gentleness as well as knowledge and skill.

OPERATIVE JUDGMENT AS A FACTOR IN SURGICAL MORTALITY AND MORBIDITY.

BY

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At the present time, it seems as though the anxiety to be known as a research worker or the desire to exhibit a remarkable degree of manual dexterity for the benefit of the bystanders were in danger of subordinating that most important factor in lowering surgical morbidity and mortality in the case of the individual patient, viz., surgical judgment.

The writer would be among the last to belittle research and laboratory work, and he envies the chosen few that dexterity which is not the heritage of the majority, but he desires to enter a plea for the benefit of the individual patient who falls into the hands of the surgeon.

Time was, and not beyond the memory of some of us, when surgery was a matter of manual craftmanship. But a limited number of operations were performed and the factors involved were simple, so that the vital question was one of speed, dexterity, ability to do a finished job in the shortest possible time, and in the middle decades of the preceding century that man who could perform an amputation or do a lithotomy the most rapidly was the man who deservedly won surgical success. Surgery then was purely an art and as a science could scarcely be said to exist.

Then appeared the era of science as applied to human physiology and those departures from the normal which we know as disease processes, and the revelations of bacteriology, chemistry, and physics made it appear that medicine and surgery were, at last, to be upon the secure footing of one of the exact sciences. Perhaps the time is coming when this will be true, when with instruments of precision all the functions of the body will be measurable, when every deviation from the normal will be capable of recognition, and when this millenium of diagnosis shall have arrived the means for correc-

tion of every error will be at hand. To-day the ultrascientific laboratory worker who is not a clinician would persuade us that this surgical millenium is almost here, and some few surgeons are willing to accept the diagnoses of clinically untrained internes and assistants, whose conclusions are purely academic in their origin and whose knowledge of the efficacy of treatment is based entirely upon the results observed while patients remain in the hospital. The research laboratories have placed at our command a great mass of data, but out of this mass there are as yet so few facts whose interrelations are thoroughly understood, that the placing of diagnoses in the hands of those without clinical training is pure folly, and acceptance of their dicta as to the course of treatment to be pursued is worse.

It is to be feared that the immature judgment of such untrained men is further warped by their desire to keep up the clinic of their chief, and certain it is that the reputed results of certain methods of treatment are exaggerated in order to show that his methods of treatment, operative or otherwise, are superior to any other.

As opposed to this is the group study of instances of obscure disease in which the clinical and *x*-ray laboratory men collaborate with the trained internist so far as possible in establishing a diagnosis, while the experienced clinical surgeon uses all the data they have collected, makes his own independent examination, and either operates or stays his hand with but one object in view, viz., the good of the individual patient, and his final decision after all is governed by one predominant factor, and that is his surgical judgment.

If he operates, the particular operation he performs, whether it is done under local, nitrous oxide, or ether anesthesia or a combination of all of them, whether he does a rapid, simple, almost crude operation, or a slow, painstaking, academic dissection, whether he drains or closes up, will depend again upon factors other than theoretical considerations, and that factor which is most important is his surgical judgment.

In the matter of the particular operation which he performs, allow me to cite two or three widely separated types of cases as examples.

Exophthalmic Goiter.—There may be an honest difference of opinion as to whether Basedow's disease is a medical or surgical condition, but there can be no honest difference of opinion as to the outcome of properly applied surgical treatment. Even this rarely gives a complete cure in the sense that all the symptoms are relieved permanently and at once, but it does convert the patient from an invalid or semiinvalid to one whose condition is such that self-support

is possible and the health nearly as good as the average, but this result cannot be obtained by slavishly following out one method of procedure, whether that be pole ligation, tying of one or more vessels, or partial thyroidectomy. The last has a prohibitive mortality if used in each and every case, the first two are not efficient in the chronic slow going type of cases, especially in women, while they not only have a very low mortality but a high permanent recovery rate in acute cases in the male, in whom the pelvic functions do not constantly disturb the patient's nervous equilibrium. By a proper selection of cases for the various procedures, by a judicious selection of the anesthetic for the individual case, and above all by speed in operating, absolute prevention of postoperative bleeding, gentle manipulation of the gland, and sealing of the relatively large raw area by painting the wound surface with tannic acid solution combined with drainage, practically every case can be saved. I was tempted to say every case, until I recalled that even the best surgical results do not prevent an occasional internist from frittering away valuable time with medical treatment until the patient is already moribund from myocardial degeneration.

I should like at this time to interject a word relative to preventing absorption from the wound and stimulating drainage by the use of tannic acid solution. All of us who use catgut hardened by means of tannic acid must have observed the nuisance of profuse serum accumulation in the wound, and this annoying feature led me to try painting of the entire tumor bed with 1 per cent. tannic acid solution before closing. Unquestionably there is a great increase in the drainage, and apparently a diminution in postoperative hyperthyroidism. Whether the latter observation is correct or not could only be proven by a larger number of cases than I have at my command, but its apparent correctness has encouraged me to continue its use.

Another set of cases in which surgical judgment is demanded is acute intestinal obstruction of the internal type, that is, such as is not due to hernia through the abdominal wall. Preëminently is this true of postoperative obstruction. I know of nothing so trying to the surgical honesty of the operator as the supervention of obstructive symptoms within a day or two after the successful completion of a difficult abdominal operation. Primarily the diagnosis is obscure, a conclusion as to the gravity of the situation hard to determine, and the nature of the operation necessary for its relief can be decided upon only after the abdomen is opened and the operator has made a survey of the field which must be accomplished both

rapidly and accurately. The diagnosis as between paralytic ileus, postoperative peritonitis, and true obstruction can be established nowhere but at the bedside, and this diagnosis is most difficult in those cases in which the primary obstruction is neither complete nor interfering in a serious manner with the integrity of the gut wall. Only too frequently the pain in such cases is considered as merely "gas pain," the occasional vomiting is thought to be neurotic or due to the modern surgical bugaboo, acidosis, and insufficient bowel motions as the result of intestinal paresis, the observer not awakening to the true gravity of the situation until collapse, extreme pain, persistent vomiting, absolute obstipation and tympany, certify that the favorable moment for interference has passed. How can the diagnosis be made before such a catastrophe has occurred? I know of but one method, and that is through the careful, systematic, unremitting observation of the trained surgical clinician, who is willing to waive all theoretical considerations and balance with accuracy the evidence which his own eyes, ears, and fingers place before him, giving every bit of evidence the weight which his surgical judgment dictates. Only this, and that intuition which is the result of past thought and experience, can guide to a correct diagnosis in time to forestall disaster.

Acute obstruction other than postoperative is less difficult of diagnosis because the patient has suffered no interference which in itself might be responsible for the symptoms presented, but again the laboratory findings are of no assistance save in a negative sense, the absence of marked leucocytosis indicating the *probable* absence of an inflammatory or gangrenous focus in the abdominal cavity. But let me repeat that the trained surgeon with an abundance of clinical experience behind him is the man who must make the diagnosis, because he should be able to make it more quickly than any one else and institute treatment sufficiently early to be of some avail.

In the treatment of intestinal obstruction the slavish obedience to some precept learned while a student or swallowed in its entirety because propounded by the master of a surgical clinic is likely to result in as serious a disaster as delayed diagnosis. To eventrate every patient through a huge incision means that the operator has utterly overlooked the possibility of death from shock due to exposure of the peritoneum and much handling of the gut; to attempt operation through a wholly inadequate incision means that an enterostomy only will be done. Reopening the primary incision in postoperative obstruction is all that is needed ordinarily since the obstruction will be found in or about the operative site, and under

any circumstances an incision large enough to admit the hand for exploration should be sufficient unless the obstruction is at a point far remote from the exploratory opening.

What should be done with obstruction when discovered is, of course, a sufficiently large subject for a monograph, but leaving out the rarer forms, the determination of our course of action is not extraordinarily difficult if preconceived notions or limited experience are not hampering the judgment. I wish to utter an earnest protest against the very common practice of making an enterostomy the end of every operation for acute obstruction. There is a place for enterostomy, but it is *not* the aim of every operation for obstruction, postoperative or otherwise. Enterostomy saves an occasional patient in whom the point of obstruction cannot be located and in whom overcoming of the distention allows a twist in the gut to unfold itself. It saves an occasional desperate case in which no effort to find the point of obstruction is justifiable, but even in this instance a secondary operation of a serious character is always demanded. My plea here is for the use of good far reaching surgical judgment, which takes into consideration not only the present but the future condition of the patient, which does not unnecessarily hazard life at the present moment, but which does not overlook the fact that a secondary operation may be of so serious a nature that an opportunity to cure now and at once should not be passed without mature consideration. It has seemed to me that many of the patients reported as saved by an enterostomy would have done equally well without, if any attempt at overcoming the obstruction had been made, and that the idea of intestinal drainage has been worked far beyond the limits of good sense and good judgment.

So, too, with the drainage of the gut at the time of operation followed by immediate closure, on the theoretical basis that absorption of the contents of the distended bowel so soon as they reach the injured intestine is likely to prove fatal. Granted that a greatly overdistended paretic intestine is better emptied than left, how many times do we actually see the gut in such condition that if that were the only indication we would proceed to empty it? This really practical reason for emptying is only too frequently bolstered up by the theoretical consideration of possible poisonous contents above the point of constriction which poison will be absorbed by the uninjured mucosa lower down. Relatively so little of the gut is emptied by puncture, and the risk of soiling the peritoneum and wound edges is so great, that if this theory of poison were universally true it would almost invariably end in

death anyway either from this source or from infection of the peritoneum and wound.

In this connection I wish to report 33 cases of acute obstruction of all types excepting intussusception, in 20 of which adhesions were released and the point of constriction oversewn if necessary but the bowel was at no time opened and all recovered; 5 in which the intestine was evacuated and then closed, with 2 deaths; 6 in which an enterostomy was made with 4 deaths; 1 resection with immediate closure recovered, and 1 enteroanastomosis recovered.

On the surface this shows a much better result for no opening of the intestine than really is true, because my own practice is to open the intestine only if it seems absolutely demanded, and it is obvious that the most seriously ill patients were treated in this manner. On the other hand, the fact that in 20 of 33 the intestine was not opened either temporarily or permanently, and that no deaths occurred, is fair proof that some enterostomies, at least, are unnecessary.

Did time permit, I should be glad to go into two other phases of abdominal surgery in which theoretical considerations or experimental work have led us from the path of safe procedure. One of these is drainage, the other the use of cathartics, more particularly postoperative cathartics, in abdominal surgery. Perhaps, I still have time merely to touch upon them.

It is not so long since drainage was practised after every abdominal operation, and with the unclean methods of operating in vogue a few years ago it would be hazardous to say that such drainage was not a very essential factor in the recovery of many patients. Then came the swing of the pendulum with the dictum that practically every patient would recover if the abdomen were closed, or as one German surgeon declared, the abdomen should always be closed and with this closure the fate of the patient is sealed since nothing more can be done, or as one American authority wrote, the abdomen should be closed after every pelvic operation, as any abscess which might form could be opened later through the cul-de-sac of Douglas. The fear we had of pus in the tubes was lessened by the laboratory demonstration that living microörganisms were absent in the great majority of instances (one place in which research was of practical clinical value) and our fear of peritonitis from soiling the pelvic cavity with the contents of chronic pus tubes disappeared when this demonstration was verified by clinical experience. It was characteristic of the profession that it joyfully and promptly concluded

that pelvic drainage was always unnecessary. What are the facts? They are that virulent peritoneal infection introduced by means of the hands or instruments to-day is almost unknown in the practice of the modern surgeon, that leaks at the suture line in surgery of the large intestine are fairly common, no matter how careful the technic, that extensive raw areas in the pelvis may not of themselves be especially dangerous, but that they often cover badly damaged, even perforated gut, and that the combination of large oozing surfaces and damaged intestine gives an excellent culture medium plus the probability that the microörganisms will migrate through the intestinal wall, and last that pelvic pus of other than gonorrheal origin is not necessarily sterile, no matter how long it may have been walled in. It follows logically that prophylactic and protective drainage (cofferdam drains) still have a very prominent place in the practice of some of us who are doing abdominal and pelvic surgery, and it is to my own partiality for drainage, when in doubt, that I attribute the recovery of every case but one in the last 217 cases of salpingitis upon which I have operated, and the patient who died would have recovered if drainage had been practised since sepsis was secondary to slow bleeding from a vessel tied in the midst of edematous inflammatory tissue.

It is our belief that it is good surgical judgment to use a rubber dam prophylactic drain to the vicinity of sutured large intestine, especially if there has been injury during the enucleation of inflamed structures and the gut wall is infiltrated. That a cofferdam led through the vagina is all important if such enucleation leaves behind a large oozing area, and that an occasional instance of salpingo-oophorectomy even for presumptive chronic disease is saved by such drainage when raw areas are left after the removal of adherent pelvic organs whose primary infection was not due to gonorrheal salpingitis.

In a syndicated health article in one of the daily papers, I notice that a distinguished internist and ex-health officer gives advice something like the following to an inquirer who asks what to do for a beginning attack of appendicitis. Put an ice bag on the abdomen, go to bed, and take a cathartic. The article is not before me at this writing so that the quotation is not exact. It probably is well that the layman with appendicitis has too much pain to depend upon newspaper advice, but it likely would be better if the entire medical profession did not seem obsessed with the idea that calomel and salts or castor oil were sovereign remedies for every sort of abdominal trouble having pain as one of the cardinal symptoms. It would be

interesting to know how many patients with appendicitis have been sent to the Great Beyond by calomel and salts.

It would be more interesting to know how many had been tormented by unnecessary distention, gas pain, and loss of sleep because of professional belief in the postoperative cathartic fetich. Aside from this morbidity, it is our positive conviction that there is a distinct mortality from the same source due to the forcing of gas and liquid feces into the temporarily paralyzed gut and consequent torsion of that portion about adherent areas. Where this idea of the value of early postoperative catharsis originated is questionable, but it was probably from the teachings of Lawson Tait, and the notion that intraabdominal drainage could be established in this manner, plus the nervous anxiety of the surgeon who knows that paresis, obstruction, and peritonitis do not exist if the bowels move, but whose judgment ought to teach him that their absence is not due to the fact that the bowels are moving. Let me repeat in concluding this imperfect and admittedly dogmatic article that it is no screed against research, but the number of research workers is so small in proportion to our needs, the published results of researches are so frequently premature and unconvincing, that unless they are absolutely substantiated by thorough going clinical observation they are not to be accepted in lieu of the great laboratory which should exist at the receiving center for the five senses of the clinical surgeon.

DISCUSSION ON THE PAPERS OF DRS. YATES, SKEEL AND CARSTENS.

DR. GORDON K. DICKINSON, Jersey City, New Jersey.—The first aphoristic statement we have heard for a long time is "postoperative cathartic feeding." That will ring in my ears for some days to come. If my friend from Detroit would try Kemp's tube I think he would find it of some advantage. He says he has not used it, yet he speaks of postoperative cathartic feeding. He feeds his patients medicine and drugs and tries to push into the lame gut, that needs to be rested, something from above. This adds to the nausea for which he gives bread crumbs. Why doesn't he wash the stomach out and let the poor thing rest? There is nothing like rest in the belly. It cannot act well without it.

Some one has said that this is an age of observation. We have research laboratories; we make observations, but nobody is doing the correlating because we have five senses and but one brain. Our five senses are working overtime and our brain is lazy. The moving picture show is all the rage. When we go to a moving picture show it does not work our brain a bit. We see with our eyes, we hear nothing, and do not understand what the lips are saying. We

should observe our patients carefully. We should not put them into a hospital for the purpose of operating, but for the purpose of observation. Do not let Dr. Jones send in a case for Dr. Smith to operate upon to-morrow. Keep the patient under observation; study the case carefully; get the atmosphere for the patient and make her understand where she is. Do not give her opiates to put her to sleep, but put her to sleep with jollying and joking. Let humor prevail. Do not let her feel that "there is nothing to be done." You may cut down the bill if you do not find as much pathology as you expected because the patient will say, "You charged me so much when you said the operation was nothing." Nevertheless, you may have saved that patient's life. Above all things, study your case. Let your intern study it and you study it with him. Use your brains. Do not go to your laboratories until you have written your diagnosis in ink, and when you have written it, stand by it.

DR. W. A. B. SELLMAN, Baltimore, Maryland.—This is a most interesting subject, and we all have the same feeling in regard to it. I must differ with the doctor who read the paper in regard to bringing patients into the hospital days or weeks before operating on them. One can easily see the evil of this. When a woman is brought to the hospital days before operation she becomes frightened. She is in a condition of shock before operation actually takes place. I believe in preoperative treatment in the patient's home where none of these disturbing influences are present.

I do not think we should operate on a case without knowing what the diagnosis is. We must make our diagnosis and then certain preparations are necessary. In some cases it is necessary to give an eliminant, that is, cathartics by the mouth to act on the intestines. In other cases one could give urotropin or formin because it is more easily secured, and is cheaper for the patient. But I think formin as given before operation is a most valuable drug, and by allowing the patient to be in a hospital only a short time before operation she does not develop fright and dread. If the patient to be operated on occupies a room adjoining a patient that is brought from the operating room, she is likely to develop fright; she is in more or less shock, and is therefore in a bad condition to be placed under an anesthetic and be subjected to a major operation.

In regard to the use of H. M. C. tablet, I have abandoned it entirely, and if the patient is restless, I give a hypodermic of morphine and atropin, namely, $\frac{1}{4}$ of a grain of morphine with $\frac{1}{150}$ of atropin an hour before operation or before the anesthetic is administered.

I have been fortunate in having a most excellent anesthetist in whom I have every confidence and I never take the anesthetic into consideration during my operation. My anesthetist is not diverted by watching the operation. I think the anesthetist should be a graduate physician, a man who has had years of experience, and one who has been trained in a large hospital. My anesthetist is a graduate of the Johns Hopkins, where he has had an opportunity of seeing a large amount of major surgical work done; he is a laboratory man, understanding the functions of every organ in the body,

and a very careful man, and he insists upon commencing the anesthetic with the essence of orange. He uses a bitter orange, claiming that sweet orange has no efficacy at all. He uses 25 per cent. of oil of bitter orange with seventy-five parts of alcohol. The result is we do not have our patient crying or struggling on the table; they do not dread anesthesia which I think is an important thing.

Many patients do not die from the shock of the operation, but death is due to shock which takes place before. The patients are in a bad condition, and if they go into a hospital a day or two before operation the shock is much less than if they are brought there and remain a week or two before operation. I think having them in the hospital several days before they are operated on has a bad effect on them. One patient will tell what she went through and how she felt after operation, and naturally the woman to be operated on will dread it and is in no condition for operation. She is not rested. Both her mind and body are active.

After an operation, if I find there is a great deal of pain, I give another hypodermic of morphine and atropin.

There is one point I would like to mention, and that is the use of drainage tubes. I do not use rubber drainage tubes any more; I use a cigarette drain of gauze wrapped with rubber tissue properly prepared. These drains are less disturbing and much more effective than a rubber tube which becomes clogged. This gauze is like a Turkish towel, it empties the pus basin, and you get the material out of the patient's body.

DR. ALBERT GOLDSPOHN, Chicago, Illinois.—In regard to the class of cases Dr. Carstens referred to concerning which there is some uncertainty as to the diagnosis, the women attending to their business and complaining all the time with a rather negative objective condition in the pelvis, he is inclined to ascribe this trouble to adhesions, and certainly adhesions do make such trouble. But every now and then we open the abdomen and pelvis and find adhesions that have not caused any trouble; and I am satisfied that adhesions are like paper, that will allow anything be printed on it. They cannot talk back. In a number of such cases I have ascertained the mode of life of such patients, the details of their domestic life, their individual habits, things they would not confess to their own mother frequently, and have found that some of these persistent complainers who have no clear objective pathology that one could find by the closest bimanual examination, have indulged in coitus interruptus, or were given to masturbation; and you will have to use all the skill and ingenuity that you are master of, to get them to confess. But it will often succeed. This abnormal habitual excitation of the sexual orgasm that is not gratified naturally is followed by a pernicious effect upon the pelvic circulation, in that it results in an excessive hyperemia. We see a varicose condition of the broad ligaments often enough; and I am satisfied that we do have varicosity of veins in the pelvis as well as we have it in the legs. In this condition the patient will have discomfort or pain. We cannot treat it in the same way that we do a varicose condition of

the legs; but we can usually offset it by an overcorrection in the sense of a suspension of the uterus up against the abdominal wall. And that can be done innocently if you know how to handle the round ligaments correctly.

In regard to the rest of patients in the hospital before operation: This is frequently needed in order to get their excretory organs in proper condition before assuming a surgical risk. Again, it is often needed to make acute inflammatory conditions in the pelvis subside properly, when they are not from the appendix, before operating. Occasionally I get a patient who has been the rounds of a number of celebrated surgeons, and has had proposed to her a gastroenterostomy or cholecystostomy, or some operation in the epigastrium, because when the woman came to the doctor she first complained of epigastric symptoms and her pelvic organs have been left quite out of consideration. I contend we cannot make up our minds finally as to what we will do for *a woman* until we have examined her from her head to her pelvis, beginning at the head and finishing with the pelvis. I believe we should go over the trunk as carefully as any specialist would and thoroughly convince the patient that we know her case before we pronounce a dictum with regard to her condition. What your dictum then is, she will have confidence in. There are cases where I cannot decide with certainty that the epigastric symptoms are due to pelvic lesions. In some of them I know that they are, when they come to me. In other instances, I cannot decide positively. I will put such a woman at rest in a hospital where she is under intelligent care and have her eat about the same things that she was accustomed to eat at home, properly prepared. But she must rest, and with bed pan service. She is not to get up to defecate or urinate. Constant complete recumbency soothes or stops both the local and referred symptoms of gynecological disorders. Accordingly, when the epigastric symptoms are of a referred nature, they will stop or greatly improve upon such preliminary rest treatment, and show that epigastric surgery is not needed, if the clearly pathological conditions in the pelvis are effectively cured.

Dr. William H. Humiston, Cleveland, Ohio.—All of the papers in this group just read are full of interest, but it is impossible in the time limit to discuss all of them.

With reference to the paper of Doctor Carstens, will state that it is possible to have a pelvic peritonitis in a patient who does not give up and go to bed—walking cases—but upon making a bimanual examination you will find tenderness and impaired mobility of the uterus. This impairment of mobility may be of any degree from slight, to a fixed condition. In cases that give evidence of having had a pelvic inflammation, do not curet the uterus, unless you immediately open the abdomen and correct fully the pathologic condition existing. The trauma of cureting the uterus and withholding complete surgical work is quite liable to be followed by a sharp reaction. The patient suffering with cirrhotic ovaries is a chronic neurotic. The constant pain wears them out together with the reflex disturbances of the circulatory system and digestive tract.

Are usually emaciated and the ovary can be palpated though smaller than normal. It is found firm and very sensitive. The tunica is thickened, and ovulation does not occur. While suffering all the time, the symptoms are all increased during the scanty menstrual period. Removal of this type of diseased ovary is essential to recovery. With but an occasional exception, I use the drop method of ether as the best and safest anesthetic. This requires a competent well trained anesthetizer to attain the ideal, and the postoperative vomiting is almost nil.

It is difficult to obtain a complete relaxation of the abdominal muscles from gas-oxygen. Besides we do have a goodly number of fatalities where it is administered by one of limited experience. I believe in lower abdominal surgery it is unnecessary to have shock. The two principal causes that produce it are hemorrhage and careless and prolonged manipulation of the abdominal viscera, both preventable in competent hands.

In that type of case that has suffered for weeks from tuboovarian suppuration, rapid pulse, some fever, loss of weight and strength, and free perspiration, who must have relief through thorough operative measures, I carry them safely over the operation without shock by a steady administration of sterile saline solution submammary during the half hour required to complete the operation. I have noted in many of these extreme cases a better pulse after completing the operation than it was for days prior thereto.

Dr. Charles L. Bonifield, Cincinnati, Ohio.—I have certainly enjoyed the paper of my friend Dr. Yates, as well as the very epigrammatic paper of Dr. Skeel. I have expressed myself on former occasions on the two subjects they have mentioned, so that I would not take the trouble to express my opinion again if it were not for the fact that they and you might think I did not still have the courage of my conviction, and that I was not still doing my own thinking in religion, politics and medicine.

Dr. Yates insists on giving these patients large doses of opium to benumb them, to stop elimination. If there is anything on earth we have learned in modern surgery, it is that we can assist nature by elimination. You can control pain; you may control vomiting often by putting the patient profoundly asleep. But you are simply shutting up the fire in the hold of the ship; you are not destroying it. On the other hand, if by stimulating these secretions of the kidneys, the skin, and the activity of the bowels, you hasten elimination, you are driving the thief out of the door. This treatment by opium was tried by the profession and weighed in the balance and found wanting before I began to practice medicine. Certain members of the profession are trying to bring it back. It had an element of truth or it would not have survived as long as it has, but its value after abdominal operation has been disproved time and again.

The other thing I want to talk about is purgation. Doctor Skeel seems to think that the bowels, after the abdomen has been opened, are so damaged or injured or insulted that to rid them of their

normal contents is to invite disease, and he wants to know where we got the idea that purgation does good. I will ask him if purgation does not do good in other conditions. All the nose and throat men purge their patients the first thing in pharyngitis or tonsillitis. If you have an acute inflammation of the eye and call in an ophthalmologist, he is very likely to give you a free purge. Lawson Tait instituted this treatment of purgation, and I got the idea of purgation by watching the immediate effects when that treatment was put into operation by my teacher Dr. Reamy, and his mortality was instantly reduced. From that time to this, I have always watched my own cases closely, and while I do not purge every case by any manner or means, yet at the hospital where I do much surgical work the Bonifield routine is well known, and when I get away from it my interns and my assistants tell me to go back to it.

A year or two ago I tried to use pituitrin, a dose every three or four hours instead of a purge, and all the boys working with me said, "Let us go back to the old routine." I admit that my patients are more uncomfortable than the average man's patients the day after operation, but I contend that the day following that, and the day following that, they are further advanced than the patient who is loaded with feces. I have learned this by bedside experience; I did not read it in any books. When I began to take care of laparotomy cases for my predecessor the work was done largely at houses in the days when we had few trained nurses, and I nursed these cases myself, I watched the effect of this treatment hour by hour, and it was from bedside experience that I came to these conclusions.

DR. WILLIAM SEAMAN BAINBRIDGE, New York City.—The subject of Dr. Yates' paper is so important that it is to be regretted that only twenty minutes can be allotted to the essayist and only five minutes to each one who discusses it.

In the preparation of the patient for the strain of a major operation as great care in every minute detail should be exercised as is given to an athlete about to engage in any important physical contest. In emergency cases, of course, this cannot always be done, but even in these cases the preoperative care should be as complete as possible. It is my practice, where circumstances permit, to begin the preoperative preparation of the patient with the mouth and to go right through to the anus. Particular attention should be given to putting the teeth in a reasonably clean condition before operation, and the rest of the mouth, the nose and the throat, especially the posterior pharynx, should be put in as good condition as possible. As to the remainder of the alimentary canal, all are agreed that it should be thoroughly cleared out, whether by enemata or by cathartics. I do not advocate the use of large doses of castor oil the night before the operation, thus rendering the patient wakeful and restless when quiet is so important. The gastrointestinal tract should be cleared out three or four days before operation, and a suitable diet of easily digested articles ordered, thus forestalling acidosis of the starvation type. It is better to remove gas before the patient is in a depleted condition than to remove it after opera-

tion. It is better to fortify the patient before operation. It is, therefore, my routine practice to hydrate with an alkaline solution or dextrose water for two or three days before the surgical intervention. More attention should be paid to the condition of the urine. If the urine is of high specific gravity, as Dr. Humiston has said, one should not proceed until this is corrected.

Urine markedly acid from the by-products of the intestinal canal or other toxins should be rendered mildly acid or neutral before proceeding. This may necessitate the use of colonic irrigation, which I have found of great value. I sometimes order 6, 8, or even 12 gallons of alkaline water during the day, using the Kemp tube, or the two rubber tubes employed by Dickinson for postoperative irrigation, inserting one 8 inches and the other 2 inches, and using a teaspoonful of bicarbonate of soda to the pint of water. With the requisite care on the part of the nurse, this plan will soon bring the urine to the neutral point without discomfort. In many cases I employ hypodermoclysis. I have found this advantageous in severe abdominal operations, such as colectomy, or the removal of other abdominal organs. After the anesthesia is complete the hypodermoclysis needles are inserted under the breasts, and from 2 to 3 quarts of saline or tap water introduced, the administration continuing throughout the operation. After the operation, if necessary, soda solution, 1 dram to the pint of water, is given by the Murphy drip, 40 drops to the minute. Experience has shown, in my hands and those of many others, that the use of 1 to 3 quarts of normal saline solution, introduced under the breasts or into the rectum, is distinctly advantageous, and is taken up by the patient without necessarily throwing too much weight on the heart or overloading the kidneys, as some have suggested, although such possibilities are to be borne in mind. After operation I never employ saline solution, preferring bicarbonate of soda or tap water. To continue the saline would certainly entail the danger of overloading the kidneys.

Referring to the matter of rubber drainage, I have followed the practice of Sir Berkeley Moynihan of having a spiral slit in the tube for all drainage other than that of a hollow viscus. The use of gauze drainage is most questionable.

DR. JAMES E. DAVIS, Detroit, Michigan.—Referring to Dr. Carstens' paper, I want to make a plea for a closer study of gross pathology. It does not seem that anywhere in this country is there an adequate assembling of material for a careful study in gross pathology. Some of the laboratories are beginning to do this work, and already there is a good beginning, but physicians could be made better diagnosticians if we had the opportunity of studying on an extensive scale gross pathological material.

Just one example of how valuable the observation of gross pathology is in the study of gynecological disease, let us take, for instance, the examination of Skene's ducts, the uterine cervix, and the orifice of the Bartholinian duct in revealing when we have gonorrheal infection. A careful study of these parts will help us materially in

making a diagnosis of gonorrheal conditions, which we all admit are etiological for a great deal of the pathology found in the pelvis.

Dr Yates has spoken of demonstrable pathology. That is largely a personal equation. One man will notice what another man may not notice, so here one must be specially trained for advantageous observation in gross pathology.

I think Dr. Skeel has rather minimized the work of research workers. I think this lesson should be taken by clinicians. If we would use somewhat the same methods that the research workers use, we would be able to advance our clinical methods very much more rapidly than we do.

Dr. Yates spoke of the use of small quantities of water following operations. I believe that small quantities of water are not of any particular advantage. It has been shown by Hertz that if you give a smaller quantity than 4 ounces of water on an empty stomach, it will remain there for a long time until the quantity accumulates to over 4 ounces. If we give 8 ounces or more the stomach will contract and empty that amount of water easily in thirty minutes, or if the patient wishes to vomit he can do so more easily rather than strain with a spoonful, or 1 or 2 ounces.

In regard to the use of formin, it does not seem to me that it is a wise procedure, when we find that the centrifuged urines under the microscope will very frequently show numerous red blood cells after you have given a number of doses of formin. This cannot be a safe procedure to follow, during a number of days preceding operative measures.

In regard to catharsis, Novy, and DeCrief have shown in an unpublished work that sensitization can be secured by injury to the epithelium of the gastrointestinal tract. If we frequently examine the epithelial surface of the alimentary canal, we will be surprised to notice the number of erosions that take place following vigorous catharsis, and if we allow proteins following this there is often a very marked sensitization produced which is most deleterious for patients about to be operated upon. Many of us have recollections of the vigorous catharsis after seeing these patients the next day. It is much better to give cathartics long enough before an operation, so that the patient can recover from any sensitization that may result.

In regard to the submammary use of salines, Novy and DeCrief have also shown in the use of salines we can have marked sensitization in many patients. Just two weeks ago I saw an example of very marked sensitization, from the use of salines given under the breast.

Dr. O. H. Elbrecht, St. Louis, Mo.—The subject of normal saline solution given under the breasts or by proctoclysis has received too little attention in this discussion. Dr. Bainbridge spoke in rather large figures as to the amount of saline he gives under the breast, he said 2 or 3 quarts. I think we all have given too much at some time or rather for there is no question but every now and then we meet with cases that we are overloading and notwith-

standing all the nice surgical work done on the operating table, we are likely to kill such patients by overloading the heart too suddenly, and this applies whether the saline is given under the breast, intravenously, or otherwise. I feel certain that I have made this mistake like many others in my earlier work.

DR. HUMISTON.—How do you give it?

DR. ELBRECHT.—By all three methods.

DR. HUMISTON.—The absorption is slight.

DR. ELBRECHT.—You should figure on how much fluid you are throwing in at one time. If you use several quarts and patients are weak from shock they cannot handle it. It is better to give say 750 to 1000 c.c. and repeat it if necessary. The same thing is true of ordinary saline given by proctoclysis, where overabsorption sometimes takes place, for these patients become edematous and no doubt many of you have seen this phenomena. The point I wish to make is that saline intravenously can be overdone, and saline given under the breast can be overdone. If you would save your patient with saline-solution you can do so just as well with a pint and a half or a quart and repeating the dose on indication rather than by giving too much at one time. If this rule is not regarded it is just the same as putting too big a load on a tired horse going up hill, because of the of the load being too heavy he will have to stop and just so with a weak heart that is overloaded.

DR. CARSTENS (closing on his part).—I have nothing to say in closing the discussion on my own paper; I would like to say a word or two about the other papers.

On general principles, I agree with most that has been said by Dr. Yates. You must get the patient in good general condition, having no material in the intestines that will create irritation. I try to do that. Before I send the patient to the hospital, if I possibly can I treat her for a while, when I do not know whether I shall operate or not. I try to put her in as good general condition as possible, and let her take, if necessary, cathartics a day or two before she is sent to the hospital, and when I decide she needs operation, I operate the next day. There are, however, cases in which I cannot make that necessary diagnosis at the patient's home. I have got to have them in the hospital where I can have a blood examination made and a Wassermann test, and the urine collected for twenty-four hours. That cannot be done in the office, hence the importance of sending them to the hospital for three or four days before operating, and if they do not require operation I send them home. This habit of having patients in a hospital several days before undergoing an operation is dangerous. Such a patient, if she hears another patient scream, is put in an unhappy frame of mind, and she thinks that the Society for the Prevention of Cruelty to Animals should come in and get busy. (Laughter.) Only last week I heard a patient scream to such an extent that she could be heard on three different floors of the hospital. I asked what was the matter with the patient, and was told that she had a severe pain, that her doctor did not believe in giving morphin. Like my friend

Bonifield from Cincinnati, I suppose this practitioner believed in giving cathartics. I would like to ask, what in the name of common sense are morphin and opium made for anyway except to relieve pain? If a doctor cannot relieve pain, of what use is he anyway? I believe we should give morphin or opium or any drug to relieve the pains of these patients. If a patient has had for several days food that is free from purin matter, and the stomach and bowels are in good condition, a couple of doses of morphin will relieve that patient and give him or her a good sleep for twenty-four or seventy-two hours. It will not hurt the patient because he or she does not need elimination. There is nothing to eliminate.

When it comes to giving a patient with an injured intestine which you have been cutting or slicing up, and sewing it end to end, or making a hole in the stomach and joining it to the opening in the intestine, and so forth, I think it is the most absurd thing that I can think of, and I regard it as mighty poor practice. What do you do with a patient who has a fracture? You do not give that patient any cathartics, do you? No, you put the leg in a splint to keep it quiet, so that circulation can be reëstablished and the lymphatics can be at work to absorb the dead blood, and that patient in a week will feel good. The same thing applies to an injury of the intestine. An injured intestine is like a sore leg, if you give it a little rest and do not move the patient's bowels for four or five days, thus giving the poor, sore bowel rest, the patient will get along very much better. In some cases you do not give enemas, In other cases you need to wash out the stomach, but to say we should never give any morphin or cathartics is very absurd. A good dose of opium will keep many of these patients quiet. We must treat each individual case by itself, and therefore I would heartily endorse what Dr. Yates has said. When I was engaged in general practice I had hundreds of cases, and I could not attend to all of them as I would like to have done and do my obstetrical work as well. When I developed into an abdominal surgeon I found out I could not do abdominal surgery successfully and attend to obstetrics as well, then I had to give up obstetrics and devote myself exclusively to abdominal surgery, so that I could devote my individual attention to these patients and not depend upon my house physician and the nurse and others.

DR. YATES (closing the discussion on his part).—Dr. Carstens in his remarks has brought out practically all that I was going to say, particularly with reference to the comparison he made of the broken arm and injured intestine.

Dr. Dickinson's manner of putting patients to sleep by hypnotism is splendid, and I presume down in New Jersey they sleep that way. Many of my patients are frightened when they come to the hospital, and if they are not frightened, they are nervous so that they are mentally unrested, and I give them a suitable remedy to make them sleep. It may be opium, trional, or something else. If I put the patient at rest by giving such a drug she is ready for operation the next day. I do not know that we all believe in what Dr. Crile does,

namely, anoci-association. I do not suppose we will believe in that, but Crile's microphotographs and pictures show the condition of the brain cells before and after excitement, before and after injury in all these cases which make up the symptom-complex of shock. We cannot get away from that point, and if we give a patient enough opium or anything else, paying attention to the elimination, that patient is going to rest, and when he or she comes to the operating table the next day, she will be in a better condition for defense. She needs all the defense she can get from the most of us.

Dr. Dickinson said that so far as he was concerned, he believed that we should make our diagnosis and stand by it, and that was all there was to it, but that we should go and have our laboratory findings, etc. I am glad Dr. Dickinson has that erudition. Personally, I have to use a stethoscope to listen to the heart; I have to use an instrument for observing blood pressure; I have to use the urinometer; I have to use the blood counting apparatus; I have to use the Wassermann test; I have to find out if my patient has a leukocytosis or if he has not, and all of these things are simply methods of precision, the same as our palpatory or auscultatory methods are means of precision; they are the means of helping us to make a diagnosis, and unless the surgeon of the present day uses these means he will not make a proper or accurate diagnosis.

I do not know exactly what Dr. Bonifield's position is with reference to purgation. I do not know what he means and when he begins it; but in the preparation of this paper I have endeavored to show that we should attend to the elimination of these patients and have their bowels free one or two days before operation is performed, and that we should have the patient's bowels at rest and, if necessary, give a dose of opium. After a patient is convalescing for a couple of days, it is the common knowledge of all of us that we feel better if we can get a little elimination, and if we can do it by some natural means, we find the patient feels better. We feel better if the patient has free elimination. It helps the passage of gas and all that sort of thing, but if we have a patient who has pelvic peritonitis or any other kind of peritonitis, which is more or less diffused, with a soiled peritoneum, it is the type of case that should have opium. The intestines should be kept quiet and thus keep the infection from being disseminated by the movements of the bowels.

Personally, I have never had bad results from using salt solution intravenously. There is a trend against it. I do not know how much truth there is to it. Novy has said some very interesting things on the subject and he seems to show that normal salt solution intravenously may produce anaphylactic shock. He also says that transfusion of blood and the infusion of salt water in the veins, or any other thing used in the veins, is more or less toxic, and it depends largely on how much we use as to when and how much toxicity we get.

I do not have very much fear about using all the water we can use;

I do not think it overloads the heart; it does not hurt the heart. If there is anything that adds to it, it is the bicarbonate of soda.

DR. ELBRECHT.— said that water is all right.

DR. YATES.—I beg your pardon.

DR. SKEEL (closing the discussion).—I have not very much to say in conclusion. There has been a fine flow of oratory but after all not much has been said. (Laughter.)

So far as salt solution is concerned, there is no question but that Dr. Elbrecht is right. I had unfavorable results from using it and discontinued it two or three years ago.

Dr. Davis seems to think I belittled the efforts of the research worker. I did not do that. In speaking of the interrelation of this most important adjunct to clinical work I stated that the research man was pouring forth on us many things that were absolutely unproven, and that only occasionally could we pick up something that was valuable from the entire mass of material. Unquestionably the research workers are doing their best, but their premature exploitations are not of much help to us as practitioners; therefore, we must use our five senses. There is no doubt about the efficacy of laboratory work.

In these days we are confronted by many theories to explain facts known for many years, one of which is the demonstration of brain cells showing the effect of fear on the Purkinje cells. The possibility that fright might cause death has been known for a hundred years, and one of the earliest physiological stories I can remember is that of the student frightened to death by being slapped on the neck with a wet towel when he was expecting decapitation. The same thing is true with reference to the theory of acidosis. We have known for a great many years that patients who have been operated upon may starve to death on an insufficient liquid diet. Now we have a new fad the hydrogen ion concentration to explain it, but the fact remains precisely as was known before.

I quite agree with Dr. Bonifield that patients feel much better after their bowels move. If the intestinal tract has been tortured by the tenesmus following the administration of calomel and salts it is not at all strange that the patient feels better after the distress incident to their administration has passed off, but he would feel equally well if they had not been given at all and would have been spared that one day's discomfort.

REMOVAL OF THE APPENDIX FOR THE CURE OF TRIFACIAL NEURALGIA AND OTHER NERVE PAIN ABOUT THE HEAD AND FACE.

BY

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THE apology I have to offer for presenting this very brief report of only seven cases is the startling results obtained. I do not claim from this small experience that we have established a new pathology for trifacial tic and kindred affections, but I do claim that in these seven cases we have fixed the pathology in the vermiform appendix, even though the physical and subjective evidence of appendicitis was so obscure as to be entirely overlooked. In all but one case, there was present almost symptomless chronic appendicitis of the obliterating type; the other a symptomless pus case. It is very probable that a report of 100 cases might reveal some further startling results in a condition where even a successful Gasserian operation frequently results in recurrence and might explain the unsatisfactory results from resection or evulsion of the nerve as well as from injections used with a view to chemical nerve destruction. Case VII of this series is more on the order of migraine or so-called sick headache. It has not been uncommon in my experience to note the cure of migraine and so-called sick headache after removal of a diseased appendix. It is quite possible that many of these cases come under the same pathology as does tic douloureux and other nerve pain about the face and head.

From the prompt cessation of the pain in six of these cases, we may conclude that the disturbance was a toxemia with selective action. If the tonsils, the teeth, the hollow bone cavities give rise to toxemias and bacteriemias of such far reaching effect, we need not be surprised if the appendix, a hollow abdominal organ with its possibilities of aerobic and anaerobic bacterial development, should give rise to a toxemia which is the basis of a selective neuritis or nerve irritation.

In Case IV we found an appendix full of pus under tension (staphylococcus pus). In this case we had a gradual reduction of the pain. In the other cases the cessation of pain was immediate.

It would appear, therefore, that in Case IV we were dealing with a neuritis, in the other cases with a nerve irritation from toxins evolved by the appendix.

The following is a condensed report of seven consecutive cases.

CASE I.—Miss G. aged forty-six, Mishawaka, Ind., Fibroid tumor; complains of neuralgia of fifth nerve left side of face, covering a period of two years. Tumor causing pressure symptoms. No suggestion of appendix trouble. Operation Sept. 8, 1915. Fibroid impacted in pelvis. Hysterectomy. Appendix found diseased (appendicitis obliterans). Appendix removed. Day following operation patient remarked that she had complete relief from her pain in the face; no attention, however, was given this statement as we confidently expected a return of the neuralgia. However, when after several days she still remained free from this pain, we began to speculate as to the cause of her cure. There was no degenerative process going on in the fibroid; therefore, it occurred to us that possibly the removal of the appendix might have caused the neuralgia to disappear. We were inclined to give the matter no great consideration.

CASE II.—Miss H., daughter of Dr. Harold, Glandorf, Ohio, aged 20. Entered hospital for resection of mandibular branch of trifacial on right side. Duration of pain about one year, lately increasing in violence. Had undergone usual treatments with arsenic, quinine, salicylate, etc., etc. Had tooth extracted and piece of bone removed from jaw. After extraction of tooth pain seemed, if anything, more constant. This young lady's father, being a physician, assured me that every possible medical and dental means had been resorted to and pointed out the futility of any further efforts in that direction. Being loath to operate on her face, unless absolutely necessary, I explained to Dr. Harold what had happened in Case I and drew attention to the further evidence of possible appendix trouble, in that the patient had had some pain in the right side. The doctor very gladly consented that an appendectomy be made before I should operate on the jaw. Operation Sept. 13, 1915. Appendectomy; chronic appendicitis obliterans with adhesions. Sept, 14, 1915, patient free from pain. Discharged Sept. 26, 1915, free from pain. Sept. 13, 1916, patient called at Saint Joseph's Hospital, Fort Wayne, to report herself still free from pain.

CASE III.—Mr. F., Kendalville, Ind., entered Saint Joseph's Hospital, July 16, 1914. Attorney, aged fifty-two. Neuralgia infra-orbital nerve left side which had regenerated after a previous operation. Had his first attack in 1894, when the trouble was attributed to an impacted molar. Molar removed; later the other teeth were removed. Had antrum of Highmore drained in 1895. Was operated on once or twice yearly for several years after this. Sphenoid, ethmoid and antrum of Highmore operated and drained. Dr. Nicholas Senn finally secured relief by removing the mandibular branch by a long incision along the lower jaw and removing the remaining affected branches by means of Langenbeck incision

(as for resection of the upper jaw). The patient gave the significant information that while under Dr. Senn's care the only medicine which seemed to afford any relief was castor oil. You will note that this case at this time antedates my experience in Cases No. I and II. Present attack began June 30, 1914. Operation July 16, 1914, resection of regenerated infraorbital branch through the antrum by incision along the scar. The anterior antral wall had been entirely removed. July 17, pain only slight. Left hospital on July 18. December 14, 1914, returned because of pain in scar under the eye. December 15, resected part of old scar. Returned to his home December 19, 1914, relieved.

September 28, 1915, returned because of pain in region of left mental foramen, extending along ramus of jaw. Operation: Injection of alcohol. Sept. 30. returned to his home relieved. Oct. 22, 1915, he returned for relief from another infraorbital attack. Operation, relief. Feb., 1916, returned with recurrence of his old trouble; close questioning revealed the fact that he had had pain in right iliac region. After laying before him the results in Cases I and II, he readily consented to having his appendix removed. Operation Feb. 17, 1916, appendectomy; appendix thickened and adherent to cecum. Result, came out of anesthetic free from pain and has remained free from pain.

CASE IV.—Mr. J. C. Payne, Ohio, aged fifty-four. Entered hospital July 19, 1916, for relief from trifacial tic; duration of malady six years. Five years ago he had partial resection of right upper jaw for tumor in antrum. Subsequently had the remaining portion of upper jaw removed for relief of pain. Since then has undergone operation eight times for relief of pain. Has been taking morphine regularly for last two weeks. No history of abdominal distress. Having laid before him the history of the previous cases, he consented to having his appendix removed before I should operate on his face. Some tenderness was elicited on pressure at McBurney's point. Operation July 19, 1916. Appendix found distended with staphylococcus pus. He complained of pain in face on coming out of anesthetic and required morphine several times. Left hospital July 3, 1916, with some tenderness in scar under eye, but much relieved. Aug. 28, 1916, returned because of pain in scar, the peculiar pain of tic, however, not having returned. Fifty milligrams radium was applied to scar which seemed to give relief. No doubt there is some inclusion of the nerve ending in the scar in this case.

CASE V.—Sister S., Glandorf, Ohio. Referred by specialist by whom she had been treated for disease of the sinuses, with the report that notwithstanding the sinuses were healed, she still continued to have pain and asked that I take such measures as I might see fit to relieve the patient from her sufferings. Patient complained of supraorbital and temporal pain, the temporal pain radiating toward the occiput. Disturbance of several years duration. Has had ethmoid curetted; maxillary, frontal and sphenoidal sinuses drained. *X*-ray and other examinations negative. Had an attack of appendicitis

twelve years ago. No present evidence of appendiceal trouble. Acting upon the experience of the foregoing cases, the patient understanding that we made no promise of relief, appendectomy was done. The appendix was found to be firmly bound down by adhesions. The patient came out of her anesthetic free from pain and has remained so since.

CASE VI.—Sister M. H., Nurse at St. Joseph's Hospital, aged thirty-two. Pain began about two years ago in left side of head and over left eye and near left inner canthus. Until recently she had obtained relief when sinus was being drained. (Antrum, sphenoid and ethmoid ware drained.) Operation Aug. 16, 1916. Appendix removed. Appendicitis obliterans. Came out of anesthetic free from pain and has remained free to the present time.

CASE VII.—Sister M. A., aged forty-seven. Teacher. Entered hospital Sept. 6, 1916. Has been suffering from headaches every week for seven years. Previous to entering hospital they had become quite constant, pain being over both temporal regions. Complained of pain in epigastrium at times, accompanied by vomiting. Attacks lasted from few hours to a day. No relation to menstruation. Tendency to diarrhea. No pain at McBurney's point or under costal margin. Her case had been diagnosed as gall-bladder disease. The abdomen was opened, but gall-bladder found healthy. Long retrocecal appendix extending well up toward liver and firmly adherent was found. This was removed, and the patient has been relieved of all symptoms since her operation.

It is quite possible that in Case II the impacted molar was a predisposing factor as was the case in Case III. In Case IV we had a history of tumor of the antrum, probably a fibroma. In Cases V and VI we had suppurative disturbance in the bony antrum as a predisposing factor in the selective action of the toxemia, and in Case VII without predisposing factor we found a bilateral disturbance.

DISCUSSION.

DR. HERMAN E. HAYD, Buffalo, New York.—A few years ago, if I had listened to a paper like the one Dr. Rosenthal has presented to-day, I would think he was demented, but I know better now and that he is bringing to us something of interest. I believe it is possible to explain the conditions he has pointed out on the ground of intestinal toxemia or intestinal stasis or peripheral reflex irritations, because it has been my experience and your experience that after removing a bound-down appendix, or the hard toothpick-like appendix, we have afforded relief in such cases of facial neuralgia and headache as those to which Dr. Rosenthal has called our attention. Of course, if we practise surgery without our five senses, and without the judgment Dr. Skeel wishes us to cultivate, we are going to do a great deal of meddlesome surgery and do a great deal of harm; but

after such experiences as the essayist has had, we must think of the possibility of such an association, and many of these chronic sufferers may be relieved, and particularly if we inquire into their cases we may find there is a tender appendix and a train of gastrointestinal symptoms.

I believe this paper is capable of doing a great deal of good, if seriously and thoughtfully considered by the fellows of this Association.

DR. ROLAND E. SKEEL, Cleveland, Ohio.—I have had two cases of sciatica that recovered *after* the removal of the appendix. I do not believe, however, the removal of the appendix had anything in the world to do with it. Most of us are familiar with the toxemic theory of the various neuritides as the result of appendicitis, but I do not believe that the sciatica in my two patients was relieved simply by removing their appendices.

A point we should consider seriously is the time that has elapsed since these operations were performed, one of them but a few days ago. Perhaps in a year from now Dr. Rosenthal will change his mind. In any event we should not accept all that has been said as proven fact upon this showing of a few recently operated patients.

DR. SIGMAR STARK, Cincinnati, Ohio.—As explanatory of the nerve phenomena coexisting in these cases of appendicitis, I would like to refer to a lecture that was delivered by Dr. Rosenow in Cincinnati last winter, the title of which in substance was "The Influence of Infections of the Gall-bladder and Appendix upon the Nervous System," and I believe some of the gentlemen present here to-day from Cincinnati were likewise present at this lecture and if so, they will recall it. In that lecture he conclusively demonstrated some interesting points bearing upon the paper under consideration. By inoculating inferior animals with streptococci obtained from infected gall-bladders or appendices of patients having herpes zoster similar manifestations would be developed in the animals. If the patient was the victim of an associate neuritis or neuralgia, then the animals so inoculated would show on postmortem examination streptococcic and leukocytic invasion of the posterior ganglion and nerve roots corresponding to the site of trouble in the human being. The purpose of all this was to demonstrate a special affinity ofcertain strains of streptococci for some particular nerve tissue. These investigations of Rosenow would readily serve to explain the beneficial results the essayist obtained after appendectomy in the cases reported.

DR. O. H. ELBRECHT, St. Louis, Mo.—One hardly knows where to begin in view of the many theories that have been presented. The last speaker brought out the theories of Rosenow which have been so fruitful in new lines of thought. As you know one of the recent theories as to the etiology of rheumatism is that it is due to an obscure chronic infection somewhere, sometimes called focal infection. Just what the infective agent is nobody knows, but it is productive of a protein poisoning, sensitizing and supersensitizing, and having seeming affinities for various groups of nerves which are then classi-

fied as various forms of neuritis, neuralgia or tic. I shall confine myself to this group as it is this one that the paper deals with. Dentists have shown, as a result of the researches and observations by Hunter of London, that the mouth is a cesspool for the development of microörganisms, and that in many cases rheumatism and neuritis are due to decayed teeth, badly fitting crowns, improperly prepared root canals, causing abscesses, etc. From such conclusions it would seem that protein poisoning is the only logical thing we have to lean on.

In connection with the paper and the theories of Dr. Rosenthal, I will say that we see almost the same phenomena or apparent cures brought about by an occasional operation on an epileptic. I have seen epileptics who had convulsions of the grand mal type once a week, get well for two to three months after a laparotomy had been performed, but the epileptic seizures returned in due time. Can such cases be put into the class of cures described by the essayist? Are we dealing with a bacterial protein poisoning, caused by focal infection in the appendix and as a result of the removal of the appendix cure the tic? I want to congratulate Dr. Rosenthal on his results and wish to say further that his cases have given us much food for thought.

DR. ROSENTHAL (closing the discussion).—I should have been very much surprised if you did not laugh at the title of my paper. If I had not had the experience which I have related to you I should have laughed myself. I presented this paper to you with diffidence. It looks odd. The cases which I have presented have coincidentally shown the form of obliterating appendicitis in six of the seven cases. The effect of absorption from the appendix is entirely in accord with the work of Rosenou. I have discussed this matter with some of the fellows here and with members of the profession elsewhere, and I have received as an opinion from them this: "It is not so surprising;" "it is a toxemia." One fellow here volunteered the information that an oculist in his city was curing hemorrhoids by proper adjustment of glasses. Such are the extremes of opinion which I have received; yet this thing is so striking that we cannot attribute it simply to the fact that we have operated upon these people. I have given you the case of one man who was operated no less than twenty times. He had a resection of the upper jaw. Here is one man who had avulsion of all the branches for the purpose of avoiding a Gasserian ganglion operation. These patients are not influenced by surgical operation. It is not mental influence. I have cited the case of a girl who took an anesthetic for the purpose of having an impacted molar removed; she had had part of the jaw bone resected, a much more impressive procedure than a well executed appendectomy. The result was startling.

I do not believe we have established the pathology for tic douloureux or neuritis or nerve irritation, but I do believe that we have revealed the fact that frequently in appendicitis we have a direct cause of a nerve irritation. Pain which disappears so suddenly and does not recur is not due to inflammatory change. That is a toxemia.

In one case we actually had pus in the appendix; there we probably had a neuritis with adhesion of the nerve sheaths and all that goes with inflammatory disturbances. We did not get so prompt a result in this case. His relief was more gradual. Yet he is now free from pain.

Dr. Skeel brought up the point that I may change my mind as to a cure a year from now; that the time since these patients had been operated is too short to speak definitely as to the ultimate results.

In the light of the seriousness of the affection and the brilliant results obtained in these cases and with the hope that something dependable may develop from the work I felt justified in bringing these cases to your attention as a preliminary report.

FIBROMYOMATA UTERI AND CARDIOVASCULAR DISEASE.

BY

BEN. R. McCLELLAN, M. D.,

Xenia, Ohio.

THE frequent concurrence of fibromyomata and cardiovascular changes together with the fact, repeatedly observed, that the cardiovascular difficulty was usually modified and often entirely relieved following operative intervention for the removal of the fibromyomata, as well as the startling fact that in each case terminating unfavorably the bad result was directly due to the advanced condition of the cardiovascular complication, led the writer to investigate the possible etiological relationship of the two distinct pathological conditions.

Practically nothing is found in text-books concerning this subject, and one must search in gynecological literature for allusions to this condition and for opinions upon its cause.

A search of the available literature revealed the fact that many other surgeons had had similar experience to my own, and that not a few had evolved theories to explain a causative relationship of these conditions. It is the purpose of this paper to review some of this literature and to report some recent personal experiences, with the hope that the discussion of the subject will awaken renewed interest, and will possibly bring about a clearer understanding of this interesting and as yet unsettled question.

According to Jaschke(1), it was Kasprczik at Hegar's clinic, who, in 1881, first called attention to the coincidence of heart disease and myoma. His case was one of supravaginal hysterectomy for myoma uteri, which, on postmortem examination, showed nothing but "paralysis of the heart." In 1883 Rose called attention to the fact that in cases of slow growing myomata secondary degeneration and atrophy of the heart muscle occur, which is often the cause of death following the operation for the removal of such tumors. Rose was decidedly of the opinion that the tumor was the direct cause of the heart complication. In 1884, Sänger, Henning, and Dürer all reported similar cases. These authorities explained the cause of death after myoma operations as being due to pulmonary emboli, but that a cardiac degeneration was the cause of the emboli.

In the same year, Hofmeier(2), in the clinic of Schroeder, reported eleven cases of death following the removal of abdominal tumors, most of which, it is fair to presume, were myomas, in which the autopsy revealed the cause due to fatty degeneration and brown atrophy of the myocardium. In his report Hofmeier was inclined to the belief that anemia and general debility, usual in such patients, are the real causes of the heart complications. It, therefore, logically followed that many gynecologists came to the conclusion that the first sign of myocardial change should be an indication for immediate operation in myoma cases. The importance of the circulatory apparatus as a prognostic factor was thus established.

Landau was of the opinion that the prolonged administration of ergot for the cure of fibroids would produce the same change in the heart and blood-vessels as it would in the uterus, that is, hyaline thrombi, and he reported two such deaths in thirty operations for fibromyomata. According to Jaschke, similar cases and contributions to this subject were published in 1890 by Russel and Kyargaard, in 1893 by Runge, and in 1895 by Katchan Bazor.

In 1889, Kisch(3) emphasized the rôle of anemia in the production of myodegeneration of the heart in connection with fibroid of the uterus.

In 1898, Strassman and Lehman(4) published an exhaustive resumé of the entire question of so-called "myoma heart" in which they stated that 40.8 per cent. of all their cases (seventy-one) gave either subjective or objective evidence of heart involvement. They also advanced the unique theory that such heart and blood-vessel changes were the evidence of advanced myomatous disease, and that the two diseases have a common etiology, namely, in the vasomotor system. They reasoned that if the cardiovascular disease is only secondary to the myoma in the uterus, that the symptoms caused directly by the tumor should precede those of abnormal cardiac conditions; but, believing that this was not the case, they concluded that the heart degeneration and the myoma are due to one and the same cause.

In 1900, Wilson(5) found that in 274 cases of myoma, 46 per cent. showed heart complications. Other causes than the presence of the myoma uteri were found to account for some of the cases, while in others they could be accounted for only by the presence of the tumor. In his opinion, the heart complications seemed to be due to long standing anemia, resulting in a disturbed nutrition of the myocardium. In 1901, Buckhard pointed out the fact that thrombosis and embolism followed myoma operations more than

they did other surgical procedures, and he thought that this was due to the heart and blood changes which are so often present in these cases.

In 1904, Fleck(6) found in 325 myoma cases at the Göttingen clinic that 40.9 per cent. of them showed heart complications. In these figures are included all cases exhibiting any deviation from normal, and Fleck insisted that such heart complications should only be considered when they produced distinct disturbances of the heart functions. He declared that "heart disease with myoma is characterized clinically by a relative insufficiency. The heart complication resembles a myocarditis, but is not identical with it." He also made pathological examinations which seemed to demonstrate that brown atrophy of the heart muscle is characteristic of fibroids without hemorrhage, and that fatty degeneration of the myocardium is associated when severe bleeding accompanies the growth. Further, he stated that the relation between myoma uteri and heart disease is explained by abnormalities in metabolism, perhaps in a hyperfunction of the ovaries, as has been pointed out by other writers.

In 1905, Winter(7, 8) made an exhaustive and critical review of the literature pertaining to this entire subject, from which he deduces the following: that many reported cases cannot be said to be produced solely by the fibroid. For example, in thirty-two cases reported in the literature, only five could be said to be due to the myoma, and in fifty-two of his own cases which came to autopsy, there were twenty-five which showed macroscopic heart changes, and of these only seven had no other explanation. Winter thinks that although there are too few cases which have been proven microscopically, the examinations by experienced clinicians in myoma patients must be given credence. In his clinic there were 266 cases in which the heart examination was minutely made. It was found that 60 per cent. gave a myoma heart, 30 per cent. had heart murmurs, mostly anemic in character, 6 per cent. had dilatation or hypertrophy, and 1 per cent. had changes in the myocardium.

In answer to the query, whether heart complications are influenced or cured by the myoma operations, Winter states that dilatation of the heart and myocardial degenerations due to hemorrhage or anemia are favorably influenced by the removal of the myoma. He insists that an etiological relationship between myoma and heart disease has not been proven, and that the heart is influenced solely by the secondary anemia which is due to the hemorrhage, which in turn is due to the myoma.

In the same year, von Lingen(9) reported sixty-six cases which were studied clinically, from which he came to the conclusion that although the actual relationship of heart disease to myoma has not been demonstrated, yet we can speak of a characteristic condition known as "myoma heart," and that its existence is an indication for early operation in such patients. Engleman also reviewed a large series of cases at Kreuznach, and speaks against the idea of a myoma heart. Schlaegle studied the autopsy findings of eighty cases of myoma which showed changes in the heart in fifty-five cases (68.5 per cent.). He is, therefore, of the opinion that there is a definite relationship between myoma and heart disease.

In the same year, Cumston(10) made a very exhaustive review of the subject, from which he concludes that the heart complications are not easily explained. He attaches considerable importance to the mechanical influence, especially on the kidneys, and (in cases of very large tumors) compression of the lungs, as well as the influence due to anemia secondary to hemorrhage, all of which he thinks are important etiological factors.

Another valuable contribution to the literature of this subject was made by Boldt(11) in the same year, who, after a generous review of the literature, says that he agrees with Winter in many of his deductions, and that in his own autopsies in these cases some degenerative changes were always found in the heart muscle, whether previously diagnosed or not, and whether or not the neoplasm had given rise to metrorrhagia or menorrhagia. Boldt further states that no particular form of cardiac degeneration is distinctly attributable to myomata, but we know the general pathological conditions of the heart, blood-vessels, and kidneys associated with myofibromata, and that clinical experience teaches that patients with myomata have a weak heart, and that this leads to venous thrombosis, especially of the femoral and pelvic veins, and these in turn lead to pulmonary embolism.

In 1905, Deaver(12) observed that "great frequency of myocarditis and arteriosclerosis is well known, and to sudden heart failure, to pulmonary embolism, or to apoplexy, may no doubt be attributed many a postoperative death occurring at the beginning of an apparently normal convalescence. The average duration of life after operation in nineteen fatal cases in my list has been five and one-half days, and while some of these deaths may be attributed to shock and exhaustion, and a few to peritonitis, yet I am convinced that in a number death was caused by preëxisting cardiac and cardiovascular disease."

Heywood Smith is quoted as explaining the cardiac hypertrophy so often found in fibroids to be due to the heart having to overcome the increased resistance caused by the extended area of circulation produced in the tumor, as well as the resistance through tissue so unyielding as a fibroid tumor.

Thalheim, Rostrom, and Lenhartz offer a unique theory to explain the cardiovascular complications on a chemical basis as a toxemia (similar to that found in Basedow's disease) from muscle extracts released from the tumor, and ask the question, "Is it possible that the tumor continually produces some form of internal secretion which may be toxic in character, and in cases of degenerating fibroids does the disintegration of protein material produce a poison capable of affecting distant organs?"

Neu(13) suggests that the thyroid gland itself may furnish the explanation of the heart symptoms.

Webster(14) calls attention to the fact that renal disturbances are more common in myoma uteri than is generally believed. In 30 per cent. of his cases one or more of the following conditions were noted: deficient amount of urine or urea, albumin, and casts, with edema of the feet, and he believes that the factors concerned in the production of these renal disturbances are probably identical with those causing the cardiac changes.

In 1909, Kelly and Cullen(15) state that their experience coincides with that of Leopold, namely, that cardiac changes in this class of cases are usually functional, and the direct result of anemia caused by uterine hemorrhage.

In 1911, Patta and Decio(16) reported an interesting investigation in which extracts taken from myomatous growths were given to lower animals. As a result of these injections, these authors report a disturbance of the pulse, with lowered blood pressure; the pulse, as a rule, became slower, then more rapid, alternating in this manner for periods of from five to thirty minutes; at no time was there an increase of the blood pressure.

In 1912, Hall(17) estimated the frequency of the association of heart disease and myoma as 40 per cent. in late cases, and claimed this percentage to be all out of proportion compared with a like number of other surgical risks, excepting goiter, and said that although the exact relation of the two diseases has not been determined, the heart complications are to be regarded as a serious handicap to these patients. Hall recommended early intervention in myoma cases.

Healy(18) found that heart murmurs were four times more fre-

quent in women with myoma than in average women without myoma.

In 1912, Doane(19) made a very careful study of this subject, and concludes that, although hemorrhages are frequent in a majority of the cases, yet as a prime factor in the cause of the heart complications it is to be excluded because the same symptoms appear in myomatous women who give no history of bleeding. Doane thinks that the cardiac changes are due to toxins developed during the growth of the tumor. He reports four cases of marked improvement in the cardiac condition after successful removal of the fibroid.

In 1913 Herz(20) endeavors to show a similar etiology for so-called "goiter heart," "myoma heart," and the heart symptoms of the climacteric, claiming that the symptoms of each are identical. He gives a common cause for the cardiac symptoms in these diseases, namely, disturbed internal secretions.

In 1914 Mahler(21) says that it is his opinion that the heart changes in myoma patients are due to hemorrhage in connection with abnormal ovarian secretion. He reports cases of improvement in the heart condition by deep *x*-ray therapy, claiming that in this way he has influenced the ovarian secretions, and thereby caused an improvement in the cardiac symptoms.

In 1914 McGlinn(22), in a most carefully prepared article, reviews the literature on the subject. He also reports the findings in a series of 244 postmortem examinations on myomatous patients in whom he seems to prove conclusively that a myoma heart due entirely and solely to the presence of the tumor does not exist; that all the heart changes which are usually found are due to so-called accidents of the tumor; that so far the weight of evidence points against the view that there are characteristic cardiac changes in myoma uteri.

Since our attention has been directed to this interesting question, we have had opportunity to carefully study twenty-six cases of fibromyoma uteri, nine of which had well-marked cardiovascular complications. In each case the diagnosis of the latter condition was confirmed by a competent internist. Of the nine, only two gave any history of other adequate cause than the presence of the fibroid uterus; these two gave distinct histories of previous acute pelvic infections. Two of the nine patients died, one within a few hours following a difficult removal of a very large multiple fibroid of many years growth, which had undergone cystic degeneration, and was complicated by very extensive adhesions to the surrounding viscera. The heart behaved badly during the operation, and death was un-

doubtedly due to shock, which in turn was caused by extreme traumatism in the presence of a heart and blood-vessels already handicapped by changes due to the presence of the chronic uterine disease. The other case, which had very pronounced cardiac and renal complications, was carefully prepared for the operation which was not difficult, although the tumor was of extreme size. The patient made an exceptionally good recovery up to the eleventh day, but died without warning, while sleeping after a dinner which she had greatly enjoyed. No doubt the cause of death was brown atrophy of the heart. Unhappily, in neither of these cases could an autopsy be secured, but both physical examination and the clinical history were enough to thoroughly establish the fact of serious cardiovascular changes. The remaining seven cases have all recovered with symptomatic relief from cardiac trouble, and only three, on careful physical examination, show some hypertrophy.

That a relationship between the two diseases exists there can scarcely be any doubt; but the etiology of the cardiovascular changes remains as yet in the field of theory, as is evident from the following brief summary of suggested causes.

(*a*) Anemia due to hemorrhage the result of fibromyomata uteri.

(*b*) A common cause of the two conditions, namely, a fibrosis in the muscularis of the blood-vessels.

(*c*) A hyaline degeneration of the blood-vessels due to enlargement of the ovaries.

(*d*) Pressure of tumor on large abdominal vessels.

(*e*) Increased resistance to circulation caused by the extended area of circulation produced by the tumor as well as by the resistance through a tissue so unyielding as a fibroid tumor.

(*f*) Interference with the freedom of heart and lung action.

(*g*) Interference with the alimentary function whereby nutrition being impaired toxic matter is absorbed from the bowels.

(*h*) Pressure on the kidneys, ureters, or renal vessels.

(*i*) Irritation of the cerebrospinal or sympathetic nervous apparatus, especially the large abdominal ganglionic masses belonging to the latter system.

(*j*) A common cause due to changes in the vasomotor system.

(*k*) Abnormalities of metabolism due to hyperfunction of the ovaries.

(*l*) A chemical basis, as a toxemia from muscle extracts released from the tumor.

The writer strongly favors this last theory because of, *first*, the similarity in cardiac disturbance in goiter and fibromyoma uteri;

second, the experiments of Patta and Decio referred to above, show a direct influence of the muscle extract upon the heart; and, *third*, because of the testimony of many anesthetists to the fact that the heart is more disturbed in myomectomies than in other operations of equal severity, except in thyroidectomies, and this always in proportion to the amount of traumatism to the neoplasm.

If the following suggestion of Boldt is generally adopted it will not be a very long time until a final and definite solution of this interesting question will be determined, namely: "The only proper and scientific method of getting at the exact relation between myomata and the heart and other internal organs is to have a competent diagnostician in internal medicine make a careful examination of each patient having myofibroma, and further, to have the same diagnostician examine the patient from time to time subsequent to the operation if one has been performed for the removal of the tumor, and if the neoplasm was supposed to have given rise to changes in the internal organs. Further changes should be carefully noted, and if the lesions were caused by the tumor, them some improvement, if not a complete cure, must be determined in the course of time. In case of death, it is not enough to make a macroscopical examination at the postmortem, but careful microscopical examination should be made of the heart and blood-vessels, kidneys, etc."

Finally, it seems to the writer that the practical lessons of interest to the general practitioner and the surgeon are, *first*, a recognition of the concurrence of the two pathological conditions. Therefore, the general practitioner should be alert to recognize the myomatous condition and not be content to persistently treat the heart condition alone, but rather aim to discover the former and advise early operation. *Second*, the surgeon should work hand in hand with the internist; each patient with myoma should be suspected of having cardiac complications and careful examination be made by a competent diagnostician of the heart, kidneys, etc. The patient should be given careful hygienic treatment, especially as to diet and exercise, and the tumor should be removed unless the cardiac and renal conditions are so far advanced as to forbid operative interference. If hemoglobin is materially reduced, an intravenous infusion should be given at the beginning of the operation. Careful cardiac tonics should not only be given during the period of preparation, but for a considerable time after the operation.

REFERENCES.

1. Rudolph Theodore Jaschke. *Centralbl. f. d. Grenzgeb. d, Med. u. Chir.*, 1912, 15, 249.
2. M. Hofmeier. *Zeitschrift f. Geburt. und Gynäk.*, 1885, p. 336.
3. E. H. Kisch. *Berlin klin. Wochenschrift*, 1889, No. 50.
4. Strassman-Lehman. *Archiv. f. Gynäkol.*, vol. lvi, p. 503.
5. T. Wilson. *The Lancet*, 1900, vol., xii, p. 1361.
6. Geo. Fleck. *Archiv. f. Gynäkol.*, vol. lxxi.
7. Geo. Winter. *Zeitschrift f. Geburt. und Gynäk.*, 1905, vol. iv, p. 49.
8. *Ibid. II Versaml. der Deutsch. Ges. f. Gyn.*, Kiel, 1905.
9. L. von Lingen. *Zeitschrift f. Geb. u. Gyn.*, 1905, vol. lxv, p. 564.
10. C. G. Cumston. *N. Y. Med. Jour.*, Oct. 28, 1905.
11. H. F. Boldt. *N. Y. Med. Jour.*, Oct., 28, 1905.
12. J. B. Deaver. *Amer. Med.*, 1905.
13. M. Neu. *Versaml. Aerzte, Deutcher*, Karlsruhe, 1911.
14. J. C. Webster. *Amer. Med.*, vol. ix, p. 401.
15. Kelly and Cullen. Myomata of the Uterus, W. B. Saunders and Co., 1909.
16. A. Patta and Decio. *Monatschrift f. Geburt. und Gyn.*, 1911, vol. xxxiv.
17. R. B. Hall. *Trans. Amer. Assoc. Obstet. and Gyn.*, 1912, p. 209.
18. W. P. Healy. *N. Y. Med. Jour.*, vol. xcvii, p. 922.
19. Phil. S. Doane. *Surg., Gyn. and Obstet.*, vol. xiv, p. 42.
20. Max Herz. *Wien. med. Wochen.*, No. 63, p. 1355.
21. Julius Mahler. *Med. Klinik*, Jg. 10, No. 14, p. 591.
22. John A. McGlinn. *Surg., Gyn. and Obstet.* vol. xviii, p. 180.

DISCUSSION.

Dr. Julius H. Jacobson, Toledo, Ohio.—We owe Dr. McClellan a debt for having reviewed the literature and brought to our attention this important subject.

For some time it has been generally known among clinical observers that a relation existed between the heart and fibroids, and with Winter, we are forced to say that some credence must be given to those clinicians who have observed the coexistence of myocardial degeneration and myoma. The question is of special importance at this time on account of the problems relating to the indications for operation. There is a tendency to treat these myomas with the *x*-ray and get away from operative treatment.

Is there an internal secretion from such tumors? There seems to be some evidence to warrant that assumption. In passing I wish to call attention to the fact that we do not know very much about internal secretions in glands like the thyroid, the adrenals and other ductless glands. We can say the same thing regarding myoma, internal secretions, and heart complications. Whether brown atrophy

of the heart muscle is due to a toxic influence from the myoma, or whether myocardial fatty degeneration is due to anemia and hemorrhage we cannot say exactly. If there are myocardial changes due to toxic influences it emphasizes the need of early operation and such heart complications should exclude the *x*-ray and other therapies than surgical.

DR. R. R. HUGGINS, Pittsburgh, Pa.—One of the important object lessons to be drawn from a discussion of this kind is the responsibility of the surgeon himself. We have not reached the time when the report of the internist offers as much help in this class of cases as could be hoped for, because he cannot know how hard the drive may be to which the patient is subjected by the surgeon. The paper read yesterday by Dr. Moots was important in that it showed the advantages from careful study of pulse pressure during operation. We have employed it in the preliminary study of our cases and have derived much satisfaction from it in patients where there is marked evidence of myocardial disease such as under discussion. Careful observation of the pulse pressure is made while resting and after exercise. If the pulse pressure is low in bed and if after exercise the systolic and diastolic pressures approach each other to a marked extent it is a good indication that the patient is a poor risk. We feel sure that a careful study of the pulse pressure will bring us near the goal in the final estimate of vital resistance in handicapped patients.

DR. J. HENRY CARSTENS, Detroit, Michigan.—I want to call attention to one thing we sometimes overlook. The more we investigate these various heart troubles, the more we are finding that a great many of these cases are due to syphilis. We have no idea how many cases of syphilis there are. I have spoken on this subject so frequently and emphasized it so vigorously that sometimes my fellow practitioners say that I have it on the brain. But they find out there is a great deal of syphilis, a great deal more than any one has an idea of. If you have a patient with heart complication, you had better look out for syphilis.

Dr. Warthin, of Ann Arbor, has demonstrated syphilis in the heart muscle in a number of cases. He has demonstrated conclusively the spirochetes in the heart muscles of patients who were considered cured of syphilis, and who manifested no symptoms of it whatever. However, on postmortem examination he has found spirochetes in the heart muscle. It shows that when we have heart trouble complicating fibroid tumors or any other pathological condition, we must look out for syphilis.

Let me say a word or two more about syphilis. I have the blood of these patients examined by the Wassermann test and the pathohologist reports them negative. He says the Wassermann test is absolutely negative. Personally, I pay very little or no attention to that, and I have found syphilis just the same whether the Wassermann test was negative or not. The Wassermann test is not absolutely reliable. I have seen patients who gave a negative Wassermann test, and yet they had syphilis. Even if the pathologist tells you that the Wassermann test is negative, you may find other evi-

dences of syphilis, and if you will give such patients mercurial treatment, the iodides and salvarsan, you will find they will recover or at least wonderfully improve. A little alcohol, a little anesthetic, and a lot of other things we do not know much about at present will negative the Wassermann reaction, so I say do not pay too much attention to it. I call your attention to this particular point because we are so liable to overlook syphilis. I have overlooked it myself. The other day I had a case in which I did not have the remotest idea the patient could be syphilitic, but after an operation I discovered that he was.

DR. JAMES E. DAVIS, Detroit, Michigan.—What Dr. Carstens has said in regard to the work of Dr. Warthin is very true. However, it does not seem to me that it applies specifically to the paper before us this morning, excepting as it might rule out quite a large percentage of cases that have directly been attributed to the effects of the myoma, in producing cardiac degenerative changes.

I want to call attention to one or two points which will help one somewhat in understanding some of the theories from the standpoint of physiology and pathology.

The unit of organization is the single cell. When we have an aggregation of cells, then the exigency of function arises. With the establishment of function canalization must be provided for, and in most all of the structures of the body we have canalization that carries the secretion from the tissue. The aggregation of cells makes the tissue, and canalization is to carry the secretion from the tissue. A single cell must functionate as a unit, or it has an internal secretion which does all its work. There is no canalization at all to the outside, that is unnecessary. The point I wish to make in connection with the paper is this, that in the formation of myomata we have muscle cells reduced to a lower or simpler form. The ordinary muscle cell is exceeded in size and the new-formed cell is larger in a myoma, and in this reduced type of cell, this degraded cell, we have a return to the primitive organization of the single cell, with no essential canalization. No lymph channels are formed with this early cell or with this aggregation of early cells, so we evidently must have an internal secretion in these newly formed myomatous cells. It seems quite logical to suppose that with these excretions or secretions of the newly formed cells thrown into the circulatory system, the blood system first, for we find in the new growths the formation of new blood-vessels much before the formation of the lymph-vessels, hence the ferment is thrown directly into the circulatory system, therefore, with the heart as a part of the muscular and circulatory systems we ought to have primary or at least secondary catabolizing effects upon the heart.

DR. BEN R. MCCLELLAN (closing).—I have nothing further to add, except the request that surgeons and anesthetists keep careful notes as to the behavior of the heart during myoma operations, in order to verify the observation already made, that the heart is disturbed more seriously in these operations than in any other, excepting thyroidectomies, and always in proportion to the amount of traumatism produced in the course of the operation.

PROLAPSE OF THE UTERUS IN NULLIPAROUS WOMEN.

BY

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Two cases of prolapsus uteri in women who have borne no children have come under my observation and serve as a basis for the consideration of prolapse of the uterus in nulliparous women. It is the most common of all lesions in the pelvis of multiparous women and one of the rarest of lesions in the nulliparous. Weinberg finds prolapse of the uterus in the new-born and in nulliparous women to constitute 3.45 per cent. of all cases of prolapsus, while Scanzoni would place the percentage at 13.15.

Virginal prolapse of the uterus occurs with greatest frequency in the new-born and in most instances there are associated congenital defects; notably spina bifida. Schaeffer reports the case of a fetus of the second half of intrauterine development, in which the uterus and vaginal walls were prolapsed and there was a well-marked spina bifida.

Procidentia in the new-born is rarely in evidence at the time of birth, but develops, as a rule, in the following week. Such infants rarely mature; death resulting from associated lesions rather than from the procidentia. The frequency with which spina bifida is associated with procidentia in the new-born is approximately 86 per cent. Nebesky records twenty cases, seventeen of which were associated with spina bifida and von Radwauski fourteen cases with spina bifida in twelve. If, however, we were to include the cases of spina bifida occulta, a lesion commonly overlooked, the percentage would be much higher. It is of peculiar interest to note the observations of Ebeler who rayed twenty-eight multiparous women with prolapsus uteri and found occult spina bifida in twenty-three (82.14 per cent.). Later twenty-eight multiparous women without prolapsus were rayed and three of this number revealed occult spina bifida. Ebeler argues, with much reason, that neural disturbances with secondary muscular insufficiency of the pelvic floor is an important

factor in the development of procidentia in multiparæ as well as in nulliparæ.

Associated with spina bifida and prolapsus uteri in the new-born are numerous congenital defects; *i.e.*, hydrocephalus, ankle clonus, club feet, scoliosis, kyphosis, flat or perpendicular pelvis, infantile uterus, flat and shallow vagina, elongated cervix, prolapse of rectum, inguinal hernia, paresis of perineal muscles and disturbed sensation in the lower extremities.

The relation of spina bifida to prolapsus uteri has been variously interpreted. Krause, together with many who have expressed an opinion, advances the theory of faulty innervation of the supporting structures in general; Ertzbischoff, to faulty innervation of the uterine ligaments alone; Haussen, to disturbances in the central nervous system, while Halban and Burger and the majority of writers on the subject account for the prolapsus on the theory of faulty innervation of the muscles of the pelvic floor. Halban and Burger noted atrophic changes in the levator ani muscles, which they ascribe to faulty innervation and Heil found hypoplasia of the fat, fascia, muscles and ligaments of the pelvis which he also ascribed to faulty innervation. It is to be borne in mind, however, that spina bifida is associated with prolapsus uteri in but a small per cent. of cases, hence the inference that there are contributing factors other than faulty innervation, such as prolonged physical exertion, malnutrition, general visceroptosis, congenital widening of the hiatus genitalis, congenital deepening of the rectovaginal pouch and oversized pelvis.

It is of interest to note that as far back as 1735 Munro reported to the Edinburgh Obstetrical Society, a case of procidentia in a girl three years of age. This case bridges over the gap between the congenital type found in the new-born and the acquired type of later years.

In several of the reported cases the procidentia occurred about the time of puberty, and in these cases it is recorded that the girls were poorly nourished; some with tuberculosis of the lungs associated with persistent coughing, others who were compelled to do hard labor.

A suggestion of the rarity of the lesion in the nulliparous women is found in the excellent contribution of Kepler who collected seventy cases in the literature up to 1911. To this number he added one of his own and eighty from personal correspondence, making in all 151 cases of procidentia uteri in nulliparous women. He classifies these cases as follows:

1. Cases due to congenital defects which occur in the new-born or at the time of puberty.

2. Cases not due to congenital defects occurring later in life.

Freund finds prolapsus occurring in the more advanced ages of nulliparous women begins as a hernia of the pouch of Douglas. As the pouch deepens the uterus and anterior vaginal wall descend. As a rule, this condition begins in early youth and develops slowly. Associated with the congenital deepening of the pouch of Douglas, Freund finds an abnormal inclination of the pelvis.

In my judgment there is an element of infantilism in most if not all the cases of procidentia in nulliparous women. The fact that these women are sterile is highly suggestive. In support of the theory of infantilism as an underlying factor in the development of procidentia, I have two cases to record.

CASE I.—Miss C., seen in the Home for the Feebleminded, Glenwood, Iowa. She was about thirty-five years of age, had acquired procidentia in early girlhood. Her sister was also feebleminded. There was lack of general development. All the pelvic supporting structures were atrophied and showed great relaxation. The uterus and vaginal walls were completely prolapsed. No observations were made as to the condition of the spine.

CASE II.—Mrs. L., fifty-five years of age, married thirty-one years, no children, menstrual periods began at fifteen years of age, always irregular (three to five weeks intervals), duration of flow five days, no pain. The menopause was established at forty-one years of age. For the past five years she suffered from frequent urination, getting up three or five times at night. She first noticed the protruding cervix three years ago at the age of forty-eight. The prolapsus gradually increased, but caused no great inconvenience until one year ago she experienced great difficulty in emptying the bladder. The prolapse was complete six months ago and remained so to the time of operation. The patient accounts for the "falling of the womb," by the years of hard work performed on the ranch where she daily carried heavy loads. She was exceptionally strong, nearly six feet in height and weighed about 180 pounds.

On examination the uterus was found completely prolapsed, the vaginal walls everted, and the pelvic floor greatly relaxed with pelvic floor muscles atrophied. No *x*-ray was taken to determine the possible existence of an occult spina bifida. The operation consisted in a vaginal hysterectomy followed by a colpoperineorrhaphy. Results satisfactory.

Other evidences of the effect of strain upon the uterine supports in the development of prolapsus, are the cases of Webster in which a wagon wheel passed over the abdomen and was shortly followed by prolapsus; the case of Green which followed the lifting of a piano and that of Lihotzky produced by strain at the age of seventy-two.

Poor nutrition in the early years of development has been cited as a predisposing factor. In two recorded cases tuberculosis of the lungs with accompanying persistent coughing brought on the prolapsus. In all these cases it is difficult to account for prolapsus in the absence of a pre-existing weakening of the uterine supports.

The relation of mental defects to prolapsus uteri is forcibly illustrated by the observations of Kepler who collected eighty cases of procidentia in nulliparous women and of this number thirty-eight were mentally defective. In this group were dementia precox, imbecility, idiocy, chronic mania, hysterical insanity, cretinism and nervousness of high degree. It has long been recognized that defective mental and physical developments go hand in hand and the casual relation of mental defects to prolapsus uteri is readily conceived.

Halban, in reporting the case of a nulliparous woman, twenty-seven years of age, whose uterus prolapsed after lifting a heavy load, expressed the opinion that the underlying factor in the development of the prolapsus was a congenital underdevelopment of the muscles of the pelvic floor. He referred to a dissection of a similar case in which Tandler found marked atrophy of the muscular supports. Martin observes that the levator ani muscle in prolapsus is often well developed. Halban admits this as an exceptional occurrence, but says that Martin overlooks the fact that the hiatus genitalis in these cases is relaxed, thereby implying that the inner portion of the levator ani muscle is defective and hence the weakened support to the uterus. Halban and Tandler do not believe with Martin that the weakening of the pelvic connective tissue and elastic fibers accounts for the prolapsus. They regard these structures as mere supports for the blood-vessels which can in no measure resist the force of intra-abdominal pressure. In support of their theory that the intra-abdominal pressure is resisted and the uterus supported by muscular structures alone, Halban and Tandler cite the cases of prolapsus in the new-born in which there is lack of muscle tone from defective innervation. Schultze is probably more near the truth when he contends that atrophy of the ligaments, connective tissue and muscles of the pelvis, all contribute to the production of prolapse of the uterus. Add to this the suggestion of Ziegenspeck that intraabdominal pressure plays the chief rôle in the development of prolapsus uteri and we have, in my judgment, the most rational solution of the problem.

BIBLIOGRAPHY.

Ballantyne and Thomson. AMER. JOUR. OBST., vol. xxxv, No. 2.

Boehm. Inaug. Diss. Strassburg, 1911; Ref. *Zent. f. Gyn.*, 1911, Nr. 51.

Bonney. *Jour. Obst. and Gyn. Brit. Emp.*, xxv, No. 6.
Burger. *Arch. f. Gyn.*, Bd. 73, H. 2.
Bumm. Ref. *Zeit. f. Geb. u. Gyn.*, Bd. lxvi, H. 2, p. 468.
Ebeler and Duncker. *Zeitsch. f. Geb. u. Gyn.*, Bd. lxxvii, H. 1.
Graf. *Monatsch. f. Geb. u. Gyn.*, xxxiv, H. 6.
Halban. *Zent. f. Gyn.*, 1913, Nr. 23, p. 858.
Halban and Tandler. Anatomie u. Aetiologie d. Genital-prolapse des Weibes, 1907.
Heidenhain. *Monatsch. f. Geb. u. Gyn.*, xxxiii, H. 5.
Heil. *Arch. f. Gyn.*, Bd. 48, p. 155.
Kepler. Amer. Jour. Obst., vol. lxiii, No. 6.
Krause. *Zent. f. Gyn.*, 1897, Nr. 16, p. 422.
Lapeyre. Ref. *Zent. f. Gyn.*, 1908, Nr. 42, p. 1407.
Liebmann. *Zent. f. Gyn.*, 1894, p. 1002.
E. Martin. Ref. *Zeitsch. f. Geb. u. Gyn.*, Bd. lxvi, H. 2, p. 460.
Mayerhofer. Ref. *Zent. f. Gyn.*, 1915, Nr. 11, p. 165.
E. Martin. Der Haftapparat d. Weibl. Genitalien, Tl. I–II, Berlin, 1911.
Nebesky. *Arch. f. Gyn.*, Bd. 87, H. 3, p. 497.
Prochownick. *Arch. f. Gyn.*, Bd. 17.
Rosenthal. *Berl. klin. Wochensch.*, 1911, Nr. 25.
Schauta. Lehrb. d. Gesamten Gyn., II–Teil.
Schaeffer. *Arch. f. Gyn.*, Bd. 71, H. I.
Schiffmann and Ekler. *Monatsch. f. Geb. u. Gyn.*, xxxii, H. 3.
Schultz. *Monatsch. f. Geb. u. Gyn.*, xxxviii, H. 6.
Sippel. *Monatsch. f. Geb. u. Gyn.*, xxxiii, H. 5.
Sutter. *Monatsch. f. Geb. u. Gyn.*, xxiv, H. 4.
Veit. Handb. der Gynäkologie, Bd. i.

DISCUSSION.

Dr. Sigmar Stark, Cincinnati, Ohio.—I believe that all of us are familiar with the coexistence of pelvic prolapse and spina bifida, but that this state is a concomitant of occult spina bifida is extremely interesting. I am unfamiliar with this feature of the etiology, but I have given the subject considerable study from an anatomical standpoint. Three years ago I spent a few weeks in Berlin with Liepmann doing dissections on the pelvis in order to familiarize myself with the work done by Tandler and Halban, and came to the same conclusions that Martin did, namely, that damage to the muscular fibers of the pelvis had absolutely nothing to do with pelvic prolapse; that pelvic prolapse was solely due to damage to the connective tissue.

The coexistence of pelvic prolapse in cases of spina bifida can readily be explained on the same basis, namely, you have a defective development of the pelvic connective tissue due to nerve influence just as is the case with the muscular tissue of the pelvis. In the case of pelvic prolapse of the nullipara unassociated with manifest spina bifida, you can readily establish the deficiency of connective tissue

throughout the pelvis. The essayist called attention to the insufficient development, the infantilism of the pelvic organs that is present. You have a small uterus, but in particular do you have a shallow vagina, and although a fairly free mobility in an upward and downward direction exists, there is an inhibition of mobility in an anterior and posterior direction, all of which is due to a lack of connective tissue.

To go back again to the subject of my observations as opposed to the findings of Tandler and Halban, I wish to say that close study of their dissection reports and illustrations fails to reveal the evidence of a laceration transversely through the fibers of the levator ani. The pathological condition of the muscles is the result of atrophy and fatty degeneration due to overstretching, hematoma or thrombosis.

What I want to say in particular is, that the whole thing to my mind is a connective tissue disturbance, as connective tissue damage is the result of the trauma of labor, so in congenital prolapse there is a deficiency of connective tissue present in consequence of faulty innervation.

DR. A. J. RONGY, New York City.—I wish to add three more cases of prolapse of the uterus in nulliparous women, two upon whom I have operated, and one that I am going to operate on, on my return to New York. The operation I did in these two women was the usual interposition operation. These women are highly neurasthenic, and if you take out the uterus they stop menstruating and become more nervous.

Dr. Stark mentioned the fact that these women usually have shallow vaginas and that the cervix is inserted very low. Most likely these women start out with a congenital retroversion of the uterus, and the intraabdominal pressure from above causes the uterus to slide down into the vagina and prolapse ensues.

DR. CHARLES L. BONIFIELD, Cincinnati, Ohio.—I wish to refer to one case I saw some years ago which bears out Dr. Findley's contention as to the etiology of these cases. This patient was a girl, fifteen years of age, an orphan, who lived with people who worked her very hard. They took her to market and she had to carry home on her arm a market basket overladen with produce, too heavy for her to carry. In order to get rid of this burden, as soon as she got into the house, she squatted on the floor, and just as she did so the uterus and vagina came out at the vulvar orifice.

Dr. Rongy is quite right in insisting that one great predisposition to these prolapses is congenital; that is, the uterus is either retroverted or retroflexed, because we all understand that as long as the uterus is of normal size and normally anteverted the increased intraabdominal pressure will only force the fundus forward; it cannot force it down. I believe that the connective tissue has some power of support. We all know that in regard to the kidney. Every one of us has seen patients exceedingly thin who have had trouble with movable kidney, and after they put on a lot of fat the kidney would move less and less, so that connective tissue must have something to do with it.

With what Dr. Stark has said I agree in the main, but I cannot agree with him that the muscle is not lacerated sometimes.

DR. STARK.—I said the levator ani.

DR. EDWARD J. ILL, Newark, New Jersey.—Dr. T. Gallaird Thomas said in his day that prolapse never occurs in a nulliparous woman. For a great many years I thought so too. The vast majority of cases of prolapse in nulliparæ are elongations of the cervix with secondary dragging down of the tissues and a secondary relaxation of the pelvic outlet. These cases do not present the condition of retroflexed uterus that Dr. Bonifield spoke of. They have an anteverted or flexed uterus and an amputation of the cervix invariably restores these patients. What shortening there may be in the vagina is atrophic, due to downward pressure. I do not think the line of demarcation has been clearly drawn between prolapse and infra-elongation of the cervix. Because a cervix appears outside of the vulva does not constitute a prolapse of the uterus.

DR. HERMAN E. HAYD, Buffalo.—This paper has been very interesting and instructive to me. While I consider myself quite familiar with surgical literature, yet this is the first time my attention has been drawn to the association of spina bifida and adult uterine prolapse. Moreover, it is the first time my attention has been drawn to the use of the *x*-ray to find the incomplete spinal development. That point is exceedingly interesting, and I am obliged to Dr. Findley for bringing the matter before us. It seems to me, this question ought to be thoroughly discussed.

So far as the frequency of this condition in the nulliparous is concerned, the essayist has looked over the literature and records 143 cases. Gentlemen, there are thousands of these cases, but we do not report them. There is not one of us who has not seen one or two cases of procidentia in the virgin, and they are usually supraelongations of the cervix. I had one of these cases referred to me by the late Dr. Schroeder. The patient was fifteen years of age who, with her friend, went into the country, and they were playing with two pails of water, one in each hand. They jumped from a rail fence, and each one tried to beat the other in the jump and spill as little water as possible. One of these young girls came to me with complete procidentia; the cervix was not simply elongated an inch and a half, but really the whole body of the uterus came out in the prolapse. I think the condition is very much more common than the essayist records.

DR. O. H. ELBRECHT, St. Louis, Mo.—I am very glad Dr. Findley presented this paper for it seems to me we are getting closer and closer to the cause of this condition by the sort of studies he has detailed here.

There are three classes into which uterine procidentia can be divided.

First the congenital. We have all seen congenital defects that were responsible for uterine procidentia, and I certainly believe spina bifida can be put in that class just as much so as the total absence of the round ligaments or the absence of one of the broad

ligaments, etc. The first case of prolapse of this class I ever saw was in a woman eighteen years of age who had a normal delivery without laceration and within two months following it a complete polapse. At operation I found a complete congenital absence of the round ligament and broad ligament, tube and ovary on one side. Spina bifida can come under the same classification as a causative factor, but it is of functional origin, the result of traction, encroachment on the cord. Accordingly we find club-foot, paralysis of the sphincters, uterine prolapse, etc., and in this way the prolapse is only one symptom (if I may use this term for the sake of clearness) of a group of defects caused by the traction of nerve roots on the cord resulting in improper innervation to the parts. The second class of cases are those resulting from traumatism during childbirth which we all know represent the most common form. The third class can be called idiopathic pelvic hernias. In this class there are no demonstrable congenital defects or evidences of traumatism and the sum and substance of this type is faulty development or atrophy. In this connection I desire to call attention to the case just referred to by Dr. Hayd and Dr. Bonifield. They spoke of the squatting position and lifting causing it. What is the usual history of the onset in inguinal or umbilical hernia. Sudden and forceful lifting or straining. All classes of uterine prolapse are herniations, but the latter class, *i.e.*, idiopathic prolapse, is certainly only one phase of hernias in the general sense arising from the same causative factors at work in the development of inguinal or the umbilical type. Proctologists in analyzing the etiological factors of rectal prolapse must cover the same ground and draw the same conclusion as we do in this field if they go back and investigate the bigger causes at work in the production of this condition.

DR. CHANNING W. BARRETT, Chicago, Illinois.—It is understood that spina bifida has much to do with early prolapse of the pelvic structures. I was glad to see the conservative position taken by Dr. Findley. The question he raises is not, whether this is the only cause of prolapse of the uterus, but he points out that spina bifida causes prolapse in women who have not borne children.

Some questions have been raised in the discussion that are of considerable importance in relation to prolapse of the uterus. As Dr. Elbrecht said, this whole question is one of hernia, and when we stop considering prolapse of the uterus as something entirely apart from other hernias, we will get at the facts more nearly. To say that inguinal hernia is due to elongation of the mesentery allowing the bowel to come out through the opening, is rather absurd. To say that prolapse of the uterus is entirely due to lack of innervation is absurd; to say that it is due to weakness of the connective tissue alone is equally absurd; to say that it is entirely due to weakness of the muscles is no less absurd. It is everything that causes or allows the structures in the abdomen to get outside of the abdomen, and therein prolapses are hernias.

Now we have no doubt but that the muscles may at times be weak, because they are poorly supplied with nerves, and if muscles are

weak they will allow structures to drag down, and the weakness of the muscles of the outlet, inasmuch as there must be an opening, will allow the opening to become larger, but to say that this is the only thing that can cause enlargement of the opening and allow herniation is going farther than most of us will want to go.

Now it is perfectly plain to me that the levator ani muscle does get injured. It is also perfectly plain to me that just as patients can have a congenital weakness of the inguinal region, a congenital weakness of the umbilical region, so they can have a congenital weakness of the vaginal region, and then if added to that a congenital weakening of muscle, we have a weakened or defective innervation, the muscle will do its work poorly. A woman can have a poor pelvic floor, and yet things not come out, but that does not say that the pelvic floor is of no value to hold the structures in. We can have a big pen with a bull in it and gate open, and the bull not come out, but that is not saying the open gate is not a weak point in the enclosure. Now then, prolapse of the organs is a herniation; that herniation will take place by reason of the upper structures being weak, by reason of the pelvic floor being weak, by reason of its being enlarged, by reason of the patient having to lift, and there is no reason on earth why a woman with weakened muscles, although well otherwise, may not have a herniation that is not due to child-birth injury. Of course, most of them come from injury of the supports during childbirth.

Dr. Findley (closing the discussion).—We cannot get away from the fact that spina bifida occurs in a large percentage of cases of prolapsus uteri in the newborn. Not a single man who has written on the subject fails to agree that it is due to faulty innervation of the pelvic supports. I was not particularly interested in what are the pelvic supports, whether muscles, fascia, ligaments, connective tissue or what not, but I wanted to bring out the point that faulty innervation is undoubtedly one of the many factors in the development of procidentia uteri, and to call attention to the very interesting observations of Epler who has taken the trouble to use the *x*-ray in cases of prolapse in nulliparous women. Who else has done it? He has found in twenty-eight cases without prolapsus that there were only three in which spina bifida oculta did exist with the prolapse. In twenty-eight cases with prolapsus, twenty-five of the twenty-eight showed spina bifida occulta. That is rather something for us to think about until we meet again. Defective innervation is only one factor in bringing about prolapsus. When I see a woman shot to pieces, where the uterus does not come down, it is simply raising the question as to faulty innervation in relation to prolapsus as one of many factors. I cannot agree with those who are trying to establish a single factor for the support of the uterus. We must conclude that not one but many factors are involved as Dr. Barrett has said.

RADIUM—A PALLIATIVE.

BY

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I HAVE for your discussion a limited experience with a small amount of radium in the relief of distressing symptoms in hopeless, malignant conditions of the female breast and pelvis. I have not a cure in mind, or even a prolongation of life, but simply relief of the symptoms. I have no apology to make for bringing before you a subject with which you, as teachers, operators and clinicians, are familiar; for I believe that these patients ordinarily receive very little consideration, after their condition is pronounced hopeless; and such patients are always in a most deplorable state, mentally, physically and socially.

The treatment of these conditions is to use opium in quantities sufficient to relieve the pain, while the obnoxious odor and acrid secretions remain uncontrolled. The profession is either skeptical, indifferent, or uninformed, as to the fact that radium is the one remedial agent that may relieve all these symptoms. While you are aware of what radium does, perhaps you have not realized, or appreciated, its clinical value in this field.

Pain is always present, requiring constantly increasing doses of narcotics. After radium has been used, the pain is materially relieved, and there is, moreover, a willingness on the part of the patient to omit the use of the opiate; at least this has been my experience and, I notice from the literature, it has also been the experience of others.

Radium also possesses the power to correct the disagreeable odor which accompanies the breaking down of cancerous tissue. This is a very great boon to the patient, as well as to the household. Further, radium controls hemorrhage.

It is not my purpose to speak of the history or physical properties of radium, or how it acts. I am like other workers of limited experience with radium in that I have only my own clinical observations and deductions to give you. With your indulgence, I present, briefly, a few histories.

CASE I.—Miss B., aet. forty, had her left breast amputated for carcinoma by a most competent surgeon; later he operated several times for the removal of postoperative nodules which continued to reappear. She was finally told that he could do no more for her, and that her only hope lay in the use of the *x*-ray. She had received twenty-eight *x*-ray treatments when she came under my observation, and, she reported, without appreciable betterment. No promise was held out to her, but that I would be glad to try radium. She was greatly emaciated, in constant pain, taking opiates continuously; she was, indeed, a nervous and mental wreck, and without relief, she could not live long. There were many nodes present in the field of operation, varying in size from large pea to pigeon egg; in addition, the entire incision was greatly indurated. She went at once to the hospital, and twenty-five milligrams of radium element was used continuously for 4000 milligram hours. She returned two weeks later, but she had been burned so severely during the first application that I could not treat her at this time. She was very cheerful and happy, however, as the nodes had diminished in size and some had entirely disappeared. The pain had ceased, and she had discontinued her opiates. The burns healed in about a month. I have treated her for the past year, once in four weeks, for 1500 milligram hours. The nodes have entirely disappeared, she has gained in weight, is free from pain, and is both cheerful and hopeful.

CASE II.—Mrs. C., aet. fifty, came into my service at the hospital. She was an emaciated, worn out, nervous woman, who had a huge malignant breast that had already commenced to break down; the axilla was full of palpable glands. This poor creature had kept her secret and worked daily for months, when the pain, odor and discharge compelled her to abandon her work. Surgery alone could promise nothing. After consulting with my colleagues, we amputated the sloughing mass, cleaned out the axilla, and buried twenty-five milligrams of radium element in the wound for 2400 milligram hours; and then used it externally continuously for 9600 milligram hours, moving it over the entire area. The pain stopped almost immediately. The wound has healed and she is very comfortable. And so far—only six months, however, there is no evidence of a return.

CASE III.—Mrs. A., aet. eighty. This old lady had no doctor. She was sure she had a cancer, and that she was going to die with it. She suffered much and had taken paregoric for months. The odor was unbearable, and it was for this she consulted a physician. Upon examination I found the pelvis a solid mass; bladder, vagina and rectal walls all being involved. I used twenty-five milligrams of radium element for 250 milligram hours in the vagina, and 250 milligram hours in the rectum the following day. She would not allow me to treat her thereafter. The pain left her within forty-eight hours, and the paregoric was discontinued. The odor diminished within ninety-six hours to such an extent that her family could be in her room, which previously was impossible. She lived about six weeks from the time I first saw her.

CASE IV.—Mrs. S., aet. sixty, came to me with the diagnosis of cancer. She had refused operation, and desired to have the radium treatment. On examination a very large cauliflower-like growth was found in the vault of the vagina. The cervix uteri could not be detected. This patient had been very stout, lost much weight, was very weak, in constant pain, and complained of a foul acrid discharge. After three applications of twenty-five milligrams of radium element for 2400 milligram hours at each treatment, at intervals of three weeks, the vaginal growth, pain and discharge had disappeared.

CASE V.—Mrs. S., housewife, aet. fifty-one, was referred to me for a hysterectomy, on account of continuous hemorrhage for over a year. All treatments resorted to had been without avail. The patient lost 30 pounds in weight, was practically exsanguinated, and edematous. Hemoglobin index 40; red blood count 3,600,000; albumin and casts in the urine. She was a grave surgical risk. I could not discover any growth.

The use of radium was suggested and accepted. Twenty-five milligrams of radium element were placed in the uterus for 100 milligram hours daily for six days; after two weeks, a similar series of treatments were given. The hemorrhage ceased on the fourth day after the first treatment, but reappeared sixteen months later. The radium was again used as before, 100 milligram hours for three days, when the hemorrhage ceased. Four months have elapsed since the second treatment was given without further loss of blood.

CASE VI.—Mrs. X., aet. fifty-six. Panhysterectomy two and one-half years previously. Complete recovery, and well for two years after. For the last six months she has had a bloody discharge from the vagina. She kept this condition from her family until the constant pain and bad odor compelled her to seek relief. A digital examination of the vagina proved impossible on account of the presence of a cauliflower-like growth. There was a profuse, bloody, purulent discharge of a vile odor. The pain was constant, loss of flesh pronounced and she was very weak. Twenty-five milligrams of radium element were used in the vagina for 2100 milligram hours. At the end of two weeks she returned for a second treatment. At this time the pain was gone, the odor much lessened, and it was possible to examine the vagina. Two more treatments of the same quantity of radium were employed at the same intervals. When she returned after the fourth treatment, all symptoms had disappeared and the vaginal growth was gone.

A synopsis of these cases shows that pain was relieved; that odor was markedly controlled; that hemorrhage had ceased; and that there was a change in or a disappearance of the local pathological tissues. Two patients died in coma two months after the treatment. Four are alive and hopeful. In Case V, the uterine hemorrhage was not of cancerous origin, but the condition was a terminal one. I am sure the patient would have died had it not been for the use of radium.

These few cases are not sufficient to draw definite conclusions. But nearly every worker with radium makes the same statements concerning its value in the relief of pain, hemorrhage and odor, but without emphasis in relation to its use in this particular field. In calling your attention to these cases, I cannot but feel that the results I have observed are more than merely accidental.

In using radium in these cases I believe it is possible to produce a toxemia which may prove fatal. I have seen the end hastened in this way. I would suggest two precautions when applying radium locally; *first*, a patient with a low leukocyte count should not be given prolonged applications of radium; and, *second*, when radium is used, it should be accompanied by the liberal administration of alkalies.

Finally, I wish to emphasize as my conviction, that no case of this type is so desperate, and no postoperative condition so hopeless, that radium should not be used with an expectation of the alleviation of the distressing symptoms.

DISCUSSION.

DR. ROLAND E. SKEEL, Cleveland, Ohio.—I am glad indeed Dr. Moriarta has called our attention to the radium treatment of inoperable carcinoma. We have been using radium only about a year, and while we have but few definite ideas to put forth at this time there are two or three things that can be said to be proven. We have used a larger dosage than Dr. Moriarta, he using a smaller quantity over a longer period of time. He gives about the same number of milligram hours as we do but the results are quite different according to the period of time over which it is applied, although the total number of milligram hours is the same.

As to the local application of radium in carcinoma of the cervix, we no longer perform the radical operation for this disease unless the case is seen very early, practically only if we find it by accident, if it is not a clinically demonstrable carcinoma, if it is proven to be such only by the use of the microscope; then we feel that it is a case for radical operation, but in patients with large cauliflower excrescences or huge excavations, even though the uterus is freely movable, our results have been so disastrous so far as recurrence goes that we resort to a palliative operation only, plus the later use of radium, and the palliative operation chosen is the Percy cauterization without preliminary curetting. As soon as the sloughing produced by the heat has stopped and the vault of the vagina is clean, radium is used. In one of our patients, a woman thirty years of age, this method was used, the primary operation having been performed five months ago. The uterus was as large as two closed fists and the whole vault of the vagina was excavated by the Percy method, followed by the

use of radium two months later. My impression is that at this time we gave her 3000 milligram-hours of radium after the method of Schauta, 50 mg. for twelve hours every second day. I examined her only a day or two before coming to this meeting and found the entire cervix gone, the vault of the vagina smooth with a dimple showing the location of the uterine canal. She has had no hemorrhage, not even a menstrual flow, and most remarkable the body of the uterus is no larger than my thumb, a really startling result from the application of this combination of surgery by heat followed by radium.

While I am glad the essayist brought up the subject of radium in inoperable cases of cancer, I would have been gratified had he spoken of its postoperative use in every case of *carcinoma of the cervix.* There are portions of the body in which it does not seem to work so well, but both as a palliative measure in inoperable cancer of the cervix and after operation as a safeguard against recurrence, it seems to be of great value.

Our one year's experience with radium in approximately twenty-five cases shows some results that on the surface seem unbelievable, and makes it certain that it is a therapeutic agent well worthy of serious investigation.

There is one more matter I wish to call attention to. That dangerous toxemia may result from the prolonged application in advanced cases cannot be doubted. One patient in whom 50 mg. of radium was buried in the wound for twenty-four hours went into a quiet sleep lasting for a week and then died. There seems not to be so much danger from its use in large doses over a short period of time as there is from smaller doses continued longer. Three of these patients I have seen go to sleep without pain, remain more or less stupid for some days, and then die quietly; to be sure they were hopeless from any standpoint and were much better off dead, but one does not wish to be regarded as a public executioner even though he secures euthanasia. I do not wish to be understood as saying that an ordinary dosage of radium in the average case is associated with any danger, but that its prolonged use in patients already toxic may cause death as above described is my conviction from my short experience with it.

DR. SIGMAR STARK, Cincinnati, Ohio.—The previous speaker has really covered the ground I wished to dwell upon, but I would like to say a few words with reference to the small quantity of radium that the doctor uses in the treatment of his malignant cases. Fifty milligrams to my mind is the smallest amount you should employ. When a person undertakes to treat a case of carcinoma of the cervix, or carcinoma of the vault of the vagina, he ought to use from 50 to 100 mg., and it ought to be used for a short period of time, possibly ten to twelve hours, at intervals of from two to four days depending upon the resistance of the patient. If you do it in that manner, you will not get serious toxic symptoms. Furthermore from the use of small quantities of radium over a prolonged period you accomplish exactly what was described by the essayist. You

destroy the carcinomatous material *in loco* through a short distance, and consequently cure it symptomatically, but you actually stimulate the growth of the tumor at a distance.

From my experience, the field of usefulness of moderate doses of radium in gynecology is principally in the treatment of benign tumors and those miserable cases we all have to contend with—those cases of idiopathic menorrhagia for which we have done everything imaginable to stop the hemorrhage, cases in which we could not find any pathological condition to account for the bleeding. I want to say to you, if you will properly use a small quantity of radium in such cases you will invariably stop the bleeding without prematurely bringing on the menopause, which is the case when you employ the *x*-ray for the same purpose.

If I am permitted time, I would like to recite two cases that came under my observation last spring. One was the case of a woman who came from Sewanee, Tennessee. She had a uterine cavity which measured 6 inches in depth and was bleeding almost three weeks out of four. She was supposed to have a fibroid tumor and sent to me for the purpose of operation. I could not make out a fibroid nodule, but considered the case one of subinvolution which was associated with a complete perineal laceration. I curetted her, and introduced into the uterine cavity forty milligrams plus radium element for a period of twenty-two hours. She left the hospital four or five days after the introduction of the radium, went home, and came back recently, and examination disclosed the fact that the uterus was shriveled up and the uterine cavity measured less than 2½ inches. There has been no bleeding since.

The other case was a young woman, twenty-five years of age, eager to have children, with no appreciable change in the uterus. There was absolutely no evidence of a pathological condition, but that woman was a sufferer from menorrhagia for several years for which she had been curetted several times. I curetted her in June, and introduced 35 mg. of radium element, leaving it *in situ* for eight hours. Her physician Dr. Lurie, of Cincinnati, told me recently that she missed her July menstruation but menstruated four to five days in moderate quantity and without pain in August and September.

Dr. Francis Reder, St. Louis, Missouri.—I would like to report a case in connection with this discussion. It was one of recurrent sarcoma of the left side of the neck operated on about four months previous to the recurrence showing itself. The tumor was about the size of a goose egg. The first operation was a very extensive one, and under the conditions I did not care to undertake a second one. The patient was anxious to take the radium treatment. In this I encouraged him. He consulted a physician who possessed $14,000 worth of radium. It was interesting to note how the tumor became reduced under the radium treatment. The bleeding, which was very free, sometimes bordering on an actual hemorrhage, ceased. The pain, which was at times very severe and acute, disappeared. It was very noticeable, too, how the patient was reduced as far as the soft structures are concerned. Two months after the application of radium the patient died.

DR. HUMISTON.—What was the cause of death?

DR. REDER.—Simply exhaustion.

DR. MORIARTA (closing).—I had no thought of considering the broad use of radium in my paper; simply wished to suggest its possible value in controlling desperate symptoms in hopeless cases. The radium treatment gave the patients comfort and relief.

Dr. Skeel has raised the point in relation to the relative value of radium applications; that is, whether it makes any difference if the same milligram hours are the result of the use of a small amount of radium for a long time, or a large amount for a short time. This point is of interest, though difficult to determine. The one who works with a small quantity of radium naturally cannot decide what a large quantity might do; and those men who have a large quantity, of course think it unwise to work with a small quantity. One of the speakers has suggested that a small amount is objectionable because it has not the power of deep penetration, and may stimulate some part, instead of annihilating the growth. It is an accepted theory that the gamma rays do not penetrate more than 5 cm. However, the discussion of these points was not my purpose. It is unfortunate that workers with a small amount of radium cannot develop technical information as to its value. Clinically, however, they are forming a number of valuable conclusions.

It goes without saying, as one speaker has emphasized, that surgery is the most valuable remedy we have in all localized malignant conditions. Experience has also taught, I am sure, that radium is a valuable aid to surgery and should be used in connection with it, particularly in breast cases. I believe it should be buried in the operative wound, and later, after the wound has healed, used externally. I believe, when used in this way, it is a very valuable prophylactic measure, although with limited data, I have no way of substantiating this conclusion. I am sure, however, that time will show its value in these conditions.

The question of toxemia in the local use of radium is interesting. The patients whom I have seen and thought died with radium toxemia, died in coma, suggesting uremia, though the secretion of urine was up to normal in quantity and specific gravity.

THE STANDARDIZATION OF DEFINITE PROCEDURES DURING GYNECOLOGICAL OPERATIONS.

BY

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A VISIT to several gynecological clinics will soon demonstrate that there are surprisingly few surgeons who have adopted standardized methods of procedure during their operations. Surgical technic in this country has attained a high plane of excellence due to advanced surgical skill, to efficient nursing and well-equipped operating rooms, but it is also true that refinement of technic and elaborate armamentarium do not always mean efficiency. Throughout the country there is a gradual awakening to the importance and necessity of hospital standardization and much discussion has been aroused in this connection. In studying hospital management and equipment, a prominent investigator recently remarked that a visit to some of our prominent American hospitals showed that the surgeon has much to learn about motion-study, time study and waste elimination.

It is a well-known fact that the gynecologist has placed pelvic and abdominal surgery on the high plane which they occupy to-day, and it is also true that the mortality in these surgical areas will probably not be much reduced, so that any advancement and improvement in pelvic surgery must be in lessening the morbidity.

Aseptic and general operating room technic are so perfected that our modern nursing corps cans be trusted with these details, and it has been our observation that any error in technic, or irregularity during operations can, in most instances, be attributed to the surgeon himself or to his assistants. It is our purpose in this discussion, therefore, to consider some factors in the gynecological operating room which may lessen still further the surgeon's responsibility and improve his operative results. These observations and deductions are based on analysis of some of our errors made in a series of over three thousand gynecological operations performed by the writer in one hospital.

In our case analysis the greatest source of error, as with probably every operator, has been in diagnosis. The gynecologist must always bear in mind that from the very anatomical and physiological nature of the female pelvic organs, they are subject to many varia-

tions within a very short space of time. As many of the conditions are chronic, immediate operation is not always performed, so that some time may elapse from the date of diagnosis to operation. We have learned from a few experiences that before operating for any pelvic condition it is a wise precaution to examine again very thoroughly immediately before operation, especially when anesthetized, not only to make a correct diagnosis and verify our previous findings, but also to exclude with certainty the existence of pregnancy, recent inflammation and carcinoma.

To operate for lacerations or chronic adnexal diseases during pregnancy is an error that is not only embarrassing but almost inexcusable. On four different occasions, patients who had been examined several weeks before, were prepared for plastic operation when the preoperative examination revealed early pregnancy, thus averting a possible abortion.

On a recent visit to several well-known clinics, the writer witnessed three pelvic operations in which pregnancy was not recognized until the operation had progressed. In each instance the embarrassing mistake was due to the operator having failed to make a vaginal examination immediately before operation and by placing too much reliance on the case-history or on the examination made at some previous time.

Appendicitis in the female simulates almost every pelvic and abdominal lesion so frequently that several errors have taught us never to neglect the pelvic examination regardless of the age or social condition of the patient. Ectopic gestation, acute pyosalpinx, torsion of cyst pedicle, retroflexed gravid uterus, and impending abortion are some of the conditions improperly diagnosed and suggestive strongly of appendicitis. A careful vaginal examination would in most instances have rendered a correct diagnosis comparatively easy. Carcinoma of the uterus, even though very early, should be diagnosed before operation as the preparation of the patient as well as the operative procedure is quite different from the general type of pelvic surgery.

Operation during acute or recurrent inflammation of the adnexa is attended with such pronounced morbidity as has been so ably demonstrated by Warder, Simpson and others, that in cases presenting symptoms of recent inflammation of the adnexa, it is our rule to postpone operations until a clear diagnosis is established and the temperature has been normal for several days. One death in our series resulted from such an oversight, and in three other instances the convalescence was unusually severe. It is our rule, therefore,

in every case except in some virgins, to cleanse the vagina, empty the bladder and to personally examine bimanually under anesthesia, after which one or both assistants may examine if the condition of the patient warrants it. We have found that the most satisfying part of the hospital interne's work in his gynecological service is the instruction he receives from such an examination. In order to analyze our mistakes, this preoperative diagnosis is dictated at once and made a part of the operative record.

Some of our mistakes have demonstrated that any disease of the uterus or adnexa severe enough to require operation also warrants preliminary curettement every though there is no distinct symptom of endometritis. Such curettement requires but a few minutes, and in addition to its rendering good uterine drainage, it is a valuable procedure from a diagnostic standpoint. Of course, all curettings are examined microscopically and have been the basis of study from different angles. By having neglected this precaution of curettement in our earlier experience, two instances of very early carcinoma of the fundus and one of tuberculous endometritis were overlooked. In another instance where pyosalpinx was correctly diagnosed and operated upon for the relief of pelvic pain and irregular bleeding, early carcinoma of the uterine body was present but not discovered until later.

The legal responsibility of the operator should be considered by him in every operation that is undertaken, and benefiting by the annoying experience of some confreres and a threatened lawsuit in our own experience, it has been a source of satisfaction to secure from the patient, the husband, or father, full consent to perform whatever operation the surgeon deems indicated. For a short time we adopted the method followed in some institutions of having the patient or his responsible agent sign a printed form releasing the surgeon as well as the hospital from all responsibility, but the method was sometimes resented, so that consent always obtained in the presence of an assistant or nurse was found more satisfying and equally protective in its legal aspect.

Unnecessary time consumed during the preparation of the patient when anesthetized has been noted in our own work in the past, and a constant endeavor is being made to eliminate such waste. Here, again, team work has been a great factor. It has been found that in a general hospital where there is of necessity a certain amount of rotation of service both in the interne and nursing corps, much time can be saved and more efficient results obtained by a course of operating-room demonstrations and lectures outlining to the beginner his

or her respective duties, so that when actual participation in operation occurs time is not wasted. The ideal method, of course, is the one that exists in some institutions, such as in the Crile and Mayo clinics, where team work predominates. With standardized methods, however, every operating room can, at least, approach a more efficient status.

Surgeons are practically unanimous in agreeing that the anesthetist is a decided factor in successful operative work. It is no exaggeration to state that our mortality and more especially our morbidity has decreased with the employment of a graduate nurse as anesthetist whose entire time is our own, rather than one who anesthetizes for different surgeons. Her duties at other times are practically that of secretary, and her constant knowledge of the patient's condition renders a follow-up system comparatively a simple matter. It may be argued that a physician experienced in anesthetics is more responsible, especially in emergency, but we have learned that the nurse after a thorough course in anesthesia is always dependable. Further, she does not aspire to become a surgeon and consequently her interest is not in the operation proper, but concerned wholly with the anesthetic.

We have demonstrated to our own satisfaction that standardized methods, once adopted, are easily followed and are productive of the best immediate as well as remote results. But it requires the hearty coöperation of a well-trained but not necessarily large organization, in other words "team work." The surgeon is at all times the responsible head in the operating room, and unless his attention to details is at all times exacting, efficiency and team work are impossible as it is only natural that the department reflects the energy and efficiency of its head.

Standardized methods, as well as a constant uniform technic, can be brought to its highest perfection only if a surgeon limits his operative work to one institution, where he can have constant supervision of his daily work and where he has additional coöperation of the hospital organization.

A harmonious relation with other members of the hospital staff is not only desirable but essential, for it is to the mutual advantage of all concerned and more particularly to the patient to have consultation and diagnostic facilities which a congenial staff only can furnish.

The presence in the operating room of friends and relatives of the patient and other nonmedical visitors is a most reprehensible practice and should be frowned upon by every ethical conscientious

surgeon. Their presence during operation tends to disturb team work and efficiency, as has been observed in other clinics.

The assistant plays a most important rôle in the surgeon's success, and after several trials it has been found that the employment of a well paid rather than a volunteer or temporary assistant is of great value. On this paid assistant devolves much more responsibility than mere assistance at operation. He is entrusted with the careful observance of all standardized methods which the surgeon has adopted, such as preoperative preparation as well as the postoperative care, and also the final examination of the patient before discharge. As chief registrar of a large general hospital for some years, we have learned that the interne as well as the house officer frequently regards the keeping of records as clerical work, and consequently such records were not accurate and of little value for subsequent study. By entrusting the supervision of records to the salaried private assistant, however, the records are of the greatest value both to the hospital and surgeon.

An elaborate technic is frequently productive of mistakes, and experience has taught us that by adopting a simple definite technic of approved methods, including a minimum variety and number of instruments, a written copy of which is constantly at hand, the possibility of errors is greatly reduced. Such standardized methods likewise make it possible to eliminate waste and to conduct the operating room on an economical as well as efficient basis. A careful study of operating-room expenses has shown that time-waste and up-keep can be reduced 20 to 30 per cent. without restricting efficiency.

The pad count has always been an uncertain and dangerous factor in abdominal technic and in spite of many ingenious devices, there is always the possibility of mistakes, especially when the counting devolves on a nurse or other assistant as is the usual practice. The responsibility of accurate pad count is so great that we have not deemed it fair to delegate that task to others. After trying several methods, we have found the following satisfactory that we have standardized it in our work. Pads of one size only are used as different sizes are confusing, and so-called wipes are never used in abdominal work. Five to fifteen pads are usually sufficient for any ordinary section, consequently only fifteen pads are supplied with more in reserve. To facilitate quick and accurate counting, the pads which are made 12 by 3 inches are arranged folded once in bundles of five, four being placed in layers while the fifth as a semiwrapper. Three such bundles are in every package, which before being sterilized, are counted at least three times. When

everything is in readiness for making the incision, the bundle of fifteen pads is opened by the first assistant. He signals for absolute silence in the operating room, and then as he exposes the pads to view one by one, the operator, first assistant, and second assistant count aloud fifteen pads. As the soiled pads are discarded, they are hung on a pad rack in full view of all in the room.

.Before the abdomen is closed and immediately after its closure, the operator and the two assistants again count aloud the number of soiled and unused pads. The counting aloud not only by the assistants, but also by the operator himself, induces a positive count and limits the responsibility to the surgeon, a responsibility which he and not the nurse should bear as has been frequently demonstrated in our law courts.

Neglect to explore the upper abdomen, when operating for gynecological affections, has resulted unsatisfactorily in several instances. In some pelvic operations so much time is consumed or such unexpected infective material is encountered that exploration of the clean upper abdomen is not justifiable. We have found it expedient, therefore, in every abdominal section to examine at once the gall-bladder, stomach, appendix and even palpate the kidney before proceeding with the primary pathology, and immediate dictation of the condition of the structure examined is made.

In a recent series of 500 consecutive operations for gynecological affections, gall-stones were discovered in forty-five instances, about 9 per cent. where the history for that condition was negative. The appendix is, of course, always examined and as an almost routine procedure removed. If not removed, particular note is made of the fact in the operative notes, as not infrequently immediate or remote postoperative discomfort or pain may indicate appendicitis and a knowledge of its condition at the time of operation is satisfying, if not conclusive.

Postoperative ileus has occurred five or six times in our series. In two cases in which a second operation was urgently indicated, the omentum was found rolled and displaced to one side of the upper abdomen. Readjustment of the omentum relieved the symptoms in both cases. This experience may explain some of the unusual postoperative pain frequently encountered, due no doubt to the violent peristaltic action of the underlying intestines. Here, again, we have made it a standardized rule in every case after pads have been removed and the peritoneal toilet completed, to lower the patient from the Trendelenberg position and then readjust the intestines and omentum.

It may be argued that all these mistakes have been recognized and corrected by every surgeon of experience, and that no new thought has been advanced. We believe, however, that if the surgeon would tabulate his mistakes and review them, together with his successes, he may discover that there is room for improvement.

Our own deductions are that: 1. Many mistakes that are made during gynecological operations are preventable. 2. While the operator is legally responsible for every action in the operating room, the average surgeon does not take adequate measures to safeguard the patient and himself. 3. By adopting a definite routine or standardized method, both for himself and his assistants, better team work is accomplished, and, consequently, lessened mortality and morbidity.

DISCUSSION.

DR. JOHN W. KEEFE, Providence, Rhode Island.—I feel that this is a remarkable and timely paper. If we would pay more attention to efficiency and to team-work in our operations, our patients would be greatly benefited.

I was glad to hear the essayist say that it is advisable after cleansing the vagina and emptying the bladder, to make a careful examination while the patient is under ether, because then one often is able to revise his previous diagnosis. In the hurry of to-day, when a patient wants to come into the hospital at nine o'clock in the evening, and be operated on the next morning, the patient is usually examined by an interne, the operator comes to the operating table without knowing much about his patient, saying, "Well, we will see what we find when we get inside the abdomen." Many times I have seen even the best operators in this country in error on opening the abdomen, when they would have acquired valuable information had they made a previous vaginal examination while the patient was under ether. This examination should be made as a routine practice.

I feel strongly with reference to counting sponges. We ought not to count sponges. We should not put sponges in the belly, and if we did not put them in, we could not leave them there. Recently, an interne in a hospital told me that during his service of a year and a half he knew of five sponges having been left in the abdominal cavity. He cited one instance where he was the first assistant at the operation, a sponge count was made, and the nurse said they were all there, and he told the operator that he felt there was still a sponge inside, and the operator replied, "Well, you heard what the nurse said." "Yes," he said, "but I still feel there is a sponge left inside." But the operator paid no attention to him. He did not try to find the sponge; he sewed the wound up, and when the young surgeon was in the dressing room he said again to the surgeon, "I do not feel right about that case; I feel there is a sponge left behind."

The operator replied, "If you think there is a sponge in there, take it out." The patient still being on the operating table, the young man opened the wound, removed the sponge, and sewed the wound up again.

Sponges or instruments must be many times left in the abdominal cavity and nobody has known that the accident has taken place. I feel it is unnecessary to pack sponges in the belly. When one stops to think how rough a piece of gauze is, when he is scrubbing his hands and arms, especially if he uses that gauze with a little pressure, he will find how irritating it is. Now with every respiration the patient makes, the sensitive peritoneum covering the intestine is irritated by the rubbing to and fro of the sponges. I feel that many of our postoperative adhesions are due to the fact that we use gauze to wall off in the abdominal cavity. This can be better done by the use of sheet rubber which is moist and smooth.

DR. JAMES F. BALDWIN, Columbus, Ohio.—There is just one point in connection with this paper that I desire to discuss briefly, and that is in regard to friends of the patient being in the operating room. I have in all my professional career been glad to have some representative of the patient in the operating room. I tell them frankly we have no operating room secrets; that we are very glad to have them in. I have never had occasion to regret it, and on many occasions I have been glad to have some friend of the patient present who can see what we have to contend with. I have sometimes said to the representative of the family, who was in the operating room, that something must be done a little different than what we expected in this case, and have gotten his consent to go ahead. He represents the patient in law as well as in morals, and I have never been sorry for allowing a member of the family or representative in the operating room; it does no harm, and it may do much good.

DR. GEORGE VAN AMBER BROWN, Detroit.—Just a word with reference to having some member or representative of the family in the operating room during the operation. We do not ordinarily allow any one in the operating room. That is a rule of the hospital, but in a recent experience the husband insisted that he be present and we consented to let him come in. After the operation he said, "Did you notice me while you were operating?" I replied "No." "Well," he said, "I watched you two doctors very closely as you stood there, to see if my wife quit breathing or looked as though she was going to die, and if there were indications of it, I had my revolver ready to shoot either one of you."

DR. JOHN D. S. DAVIS, Birmingham, Ala.—Referring to packing the abdomen with sponges, I will say that I no longer use small packs or sponges. In my work I have three sponges, one of which is used in the abdomen, one for gall-bladder cases and one for a general and abdominal sponge. Two of these are about 5 inches wide by 15 feet long, and one $2\frac{1}{2}$ inches wide by 3 feet long. This last named is for use in gall-bladder cases. One sponge 15 feet long by 5 inches wide is enclosed in a pouch and attached to the

patient's side. When the abdomen is being opened this sponge is pulled out of bag or pouch and used for mopping or wiping away blood, and as used is deposited in basin. The second long sponge 15 feet by 5 inches is immersed in warm normal salt solution and used to pack off the intestines. This has a long tape to which a pair of forceps is attached. There is never any small individual sponge or pad put in the abdominal cavity. I think this precaution is necessary regardless of every other care we might take. If we use individual sponges, we are sometimes liable to leave one in the abdominal cavity.

DR. CHARLES L. BONIFIELD, Cincinnati, Ohio.—I do not rise to discuss the various minor differences of technic, because I think it is important that every man should work out his own technic, and only depart from it when he is thoroughly convinced that there is something better, and train his assistants in turn to follow that technic. It saves time.

There are two points I wish to refer to, and I know Dr. Crile will disagree with me, and one is about the nurse giving the anesthetic. I thoroughly believe in women giving anesthetics, but a woman doctor is better. I still believe that there is not work enough for the doctors as it is, and we ought to employ members of our profession if we can. In the second place, it has been my observation that the hardest thing we have to do with nurses is to keep them from getting the swelled head, and if you get them to do some of the work that belongs to us they think they can do it all.

Last Sunday morning a friend of mine brought in a patient with an acute gall-bladder condition. The gall-bladder was filled with pus, and because the patient did not seem to be dying the nurse did not see the necessity of operating on Sunday. I was thoroughly convinced that the patient should be operated upon that day. But that is the trouble with nurses. The more you give way to them, and the more you do for them, the more you spoil them.

The next point has reference to the paid assistant. I have always had an assistant but do not usually pay him, and the reason I do not pay him is this: I served an apprenticeship myself, and the only place to learn surgery is at the operating table or across the table from some good man. I believe operators, like Dr. Humiston and Dr. Crile, ought to be able to turn out five or six good operators during their active careers. I have turned out three, and I hope to turn out three more before I die. In giving them this apprenticeship, it introduces them into my clientele, and establishes them in practice. I think they are getting ample pay without cash, and I have never had any difficulty in keeping them. Usually I have to tell them when they must go and practice for themselves; that they have been with me long enough and should now stand alone. I want to impress and emphasize the one thought, that it is our duty as surgeons to make other surgeons and to rotate assistants as often as is consistent with having them do good work.

DR. WILLIAM SEAMAN BAINBRIDGE, New York City.—In discussing the paper of Dr. Weiss, I wish to take up the discussion where

Dr. Keefe left off, knowing that the latter has not had the opportunity of covering all the points that were in his mind, especially with reference to the matter of pads. Two points are to be especially emphasized in this connection, namely, the prevention of friction and the prevention of chilling the abdominal structures. If pads are used, they should be covered with rubber or oiled silk, in order to eliminate friction upon the peritoneum or other tissues. In abdominal explorations I use gloves, oiled with sterile paraffin, free from fluorescent hydrocarbons and sulphur or sulphur by-products. Furthermore, all pads and large instruments used in the abdominal cavity should be warmed. If these precautions are observed there would be less danger of postoperative adhesions, ileus, or other complications.

The condition of the bladder should always be carefully investigated. In this connection I recall a case in which I was asked to do a laparotomy for hypogastric tumor, situated half an inch above the umbilicus. According to the history, the patient had been passing 40 to 50 ounces of urine every twenty-four hours during the two weeks that she had been under observations. I insisted upon catheterizing the patient, and upon doing so obtained 78½ ounces of urine. The tumor disappeared, and no operation was performed.

DR. RUFUS B. HALL, Cincinnati, Ohio.—I rise to discuss one or two points in connection with this paper. I think that each operator should perfect his own technic in reference as to what goes inside the abdomen. If he uses pads, he should have his own technic perfected regarding their use; this method would eliminate leaving something inside, *with due care.*

In the next place, I wish to speak in reference to visitors being in the operating room. My experience has not been as pleasant as that of Dr. Baldwin, but I am of a different nervous temperament perhaps from my friend Dr. Baldwin. It annoys me considerably to have the husband or a brother or sister in the operating room, and sometimes it becomes exceedingly unpleasant. I have had a number of unpleasant incidents occur, one of which I would like to mention as a curiosity.

I was asked to do an operation on a patient for appendicular abscess; he was the only son of a prominent doctor in our city, a boy about sixteen years of age. It was a late operation. The father refused operation for about three or four weeks after the family physician had urged it because he, the father, said all of his friends who had been operated for appendicitis were out in Spring Grove, which is our cemetery. I saw the boy three or four weeks previous to operation, and then advised an operation. Once in the interval I went to see him and said it was rather late for any kind of operation now, and with the family doctor I thought the boy would die. However, a week later the father wanted him operated, and insisted on being in the operating room at the time. The boy had an enormous tumor, the size of an adult's head, in the lower abdomen. When I opened into the abscess cavity, the father demanded that we quit the operation, and not even sew up the wound, and so he

had to be put out of the room forcibly before we could finish the operation. The boy recovered and is still living, but that incident was very unpleasant, and I do not think we ought to encourage anything of that kind. If the family has not the confidence in the surgeon and are unwilling to accept the statement of the family physician, he being present, the surgeon would be better off not to have anything to do with that patient.

DR. GEORGE W. CRILE, Cleveland, Ohio.—The question of the anesthetist has interested me very much, and I agree entirely with the essayist that the nurse anesthetist is the best solution of the anesthetic problem. She is very amenable to training, it is the height of her ambition to succeed, and she can train others. She becomes a resident in the hospital, so that an expert anesthetist is at hand for service both day and night. To show what the nurse anesthetist can do, I may say that in the surgical service of the Lakeside Hospital, nurse anesthetists have administered nitrous oxid over 1600 times without one fatality. Certainly this fact speaks well for the nurse anesthetist.

DR. TATE.—Is it not against the laws of Ohio to have a nurse administer anesthetics?

DR. CRILE.—I believe that question is now under discussion in Ohio, and it has not yet been finally decided. It is certain that in any case the laws should be so framed as to permit the most efficient solution of the anesthetic problem.

DR. WEISS (closing).—Nobody would accuse Dr. Baldwin of advertising because he is above that, but I do not approve of having visitors in the operating room. I look upon it as a cheap advertising scheme, to say nothing about the ethics.

A MODIFIED GILLIAM OPERATION AND ITS ULTIMATE RESULTS.

BY

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Chicago, Illinois.

RETRO-VERSIO-FLEXION of the uterus *per se*, is an abnormal condition which invites complications and sequelæ of a much more pronounced pathological nature. It interferes with the bladder and rectum. It is the first step in descensus of the uterus, because the normal retentive angle formed by the long axes of the uterus and vagina, respectively, is eliminated, permitting the uterus to slide, like a wedge, down in the vaginal tube. Retroversion is more harmful to the ovaries than to the uterus. To a uterus without ovaries it might be more innocent of harm. In the ovaries, chronic inflammatory conditions and follicular degeneration are the result of the persistent venous hyperemia and traumatism, to which descended and prolapsed ovaries are subject. It is true, exceptional cases are not rare, in women with retroversion who live many years in good or fair health, either because they have a strong resistant organism, or are mentally not disposed to yield to their feelings; or they are so situated as to take life easy. But the skilled neutral observer can often detect in them local or referred symptoms due to this weakness, and the first spark of potent infection finds in them a loaded magazine.

Those in our ranks who recognize no evil in this condition, until a blaze has occurred, will, usually, also operate upon cases of such displacement which have pronounced complications; and they profess to do so for the latter chiefly. If they want to be consistent, they can treat the complications only, but they must leave the uterus where they find it; for according to their teaching, any position of the uterus is normal as long as it remains within the pelvis. But almost invariably they do something to correct the displacement; and in doing so, their action belies their words as to the harmlessness of retroversion.

Aside from mechanically interfering with the bladder and rectum,

the potential pathological factor in retroversion and retroflexion of the uterus is the involved embarrassment of the venous circulation in the parts. This results from the inevitable torsion of the broad ligaments in which most of the veins are suspended. W. Waldeyer(1) says, "retroflexion of the uterus, as stated, must under all conditions be regarded as a pathological position." He says: The broad ligament of each side is a quadrangular fold of peritoneum, somewhat rounded off, the width of which nearly equals its length; that it extends in an approximately horizontal direction or at right angles to the perpendicular axis of the body, and carries between its blades most of the blood-vessels and nerves that supply the uterus. When such a fold, not over 7 to 8 cm. in length and nearly the same width, is twisted from one-half to three-fourths of a turn under continued tension, it is very evident that veins in its embrace will be constricted at some points, and will suffer from traction, if not from torsion, enough to impede the venous current. Thus a constant passive hyperemia and, sometimes, even a varicose condition is induced with trophic changes which result in catarrhal conditions of the mucous membranes, in follicular degeneration of ovaries, and in a generally diminished capacity to withstand infection.

In cases of descensus uteri, there is added to the evils of torsion of the broad ligaments just spoken of, the more pronounced factor of traction upon them in variable degrees. And to relieve the evils to involved veins and nerves, that arise from both traction and torsion of the broad ligaments, it is indicated to suspend effectively the uterus from above and to replace the cervix backward in the pelvic cavity, by shortening the sacrouterine ligaments. Such a suspension is best made by a substantial transplantation of round ligaments into the abdominal wall of the Gilliam type. This alone must be considered when pregnancy is possible; otherwise, it may be supplemented by ventrofixation in cases of prolapse. The shortening of sacrouterine ligaments may be made from above by laparotomy or by way of the vagina, either in the posterior culdesac or in front of the cervix. But aside from these more formidable cases, there is a smaller percentage of mostly younger patients in whom the uterus has settled down low in the pelvis in neither an anteverted nor retroverted position; its long axis being nearly parallel with that of the pelvic cavity. Torsion of the broad ligaments does not exist. However, the local symptoms and others are as pronounced as in the average case of retroversion without adhesions. They are best and permanently relieved by suspension of the uterus. During

operation, in these cases, the excessive development of veins in the broad and ovarian ligaments will usually be found.

Types of these cases are young nulliparæ who have been given to coitus interruptus, and virgins who have become victims of masturbation. When by conditions of this kind, but more generally by retroversion or flexion of the uterus with or without adhesions, the normal competence of the veins involved has been lost, the disorder is best treated by not merely a surgical correction of the version, but by adding thereto an overcorrection in the sense of an efficient round ligament suspension of the uterus above the plane of the pelvic inlet. The ovaries in particular will, positively, be more comfortable and free from future disorders the higher they are located out of the pelvic cavity, but without direct fixation.

Operations.—1. *A curetment* is made in practically all cases. It consists of a sufficient dilatation of the cervical canal to use a loop curet of more than 1 cm. in width; this is preceded by a small spoon curet which cleans out the tube angles and the crevice extending transversely between them. After drying out the endometrium with a strip of gauze it is treated with from 2 to 4 c.c. of equal parts of tincture of iodine and alcohol, which is introduced to the fundus after renewed dilatation, with a syringe and swabbed about with its cotton-covered nozzle. In young patients with simple cervical catarrh, we only scrape the cervical canal and apply 1 per cent. solution of nitrate silver; while in confirmed old gonorrheal cases the scraping act is preceded and followed by the nitrate of silver solution. In all these cases the cavity is finally packed with a strip of plain gauze, which remains forty-eight hours, chiefly to insure a thoroughly free cervical canal for drainage during the time that the intrauterine wound heals.

2. If the cervix is indurated, a frequent sequel to earlier cervicitis following lacerations, an amputation of 1 to 2 cm. is made by a flap method that guards against subsequent stenosis of the new external os. In cases of deep lacerations into the vaginal insertion, these deeper portions of the tears are closed, after their cicatrices have been exsected by the Emmet technic, and the indurated lips are removed. The aim in this work on the cervix is to leave enough of the upper portion of the cervix to serve in subsequent gestation, and to remove as much as may be permitted of the indurated tissues in which are found the more deeply seated Nabothian follicles (retention cysts from constricted cervical mucous glands) from which carcinoma most frequently develops in later years.

3. Occasionally, when a marked cystocele exists, it is reduced,

after detaching the bladder sufficiently, by imbricating the redundant vaginal flaps, after the outer surface of one side has been denuded of its surface epithelium enough to secure a plastic union with the undersurface of the opposing flap.

4. When needed, my fundamental intrapelvic perineorrhaphy(2) follows next.

5. *Abdominal Section.*—After severing adhesions, removing neoplasms when present, removing a tube and ovary or resecting them when needed, the round ligament of one side is caught in a forceps about 2 to 3 cm. from its origin, together with a generous fold of the enveloping peritoneum. This is unitedly severed by blunt dissection from the main portion of the broad ligament and is drawn up in a loop with special care to leave the tube untrammeled and not in danger of being drawn into the abdominal wall with the round ligament loop. The gap in the broad ligament is then closed with hemostatic stitches. When this loop has been formed on each side and all work on the adnexæ is completed, the subcutaneous fat is cleared away sufficiently from the aponeuroses of the recti near the lower end of the wound; a puncture is then made about 2 cm. away from the wound and about 3 cm. above the os pubis, with a thin and pointed artery forceps, through the aponeurosis, rectus muscle and peritoneum; the prepared loop is caught directly from the bite of the first forceps and is drawn into and through the puncture wound until the distal portion of the round ligament and the fundus uteri are both drawn up against the abdominal wall. The loop is then fastened by mattress sutures in the abdominal wall and its projecting end is cut away. After the appendix vermiformis has been removed and epigastric structures explored with bare fingers, the abdomen is closed.

The aim in this operation is to leave no more space between the fundus uteri and the upper edge of the pubis than the bladder when full, will occupy, so that there be no vacant space or tract around the new uterine supports for the small intestine to become entangled, for laterally from the supports the space below is closed off by the distal portion of the round ligament drawn up against the front wall. Aside from a suspected temporary intestinal embarrassment during the second week, in one of my first cases treated in this way, I have never had occasion even to suspect such a sequel. No criticism against the operation, performed in this way, will stand on the ground of the possibility of inviting intestinal obstruction as being anything but imaginary.

The advantages of this procedure over the numerous other meth-

ods of implanting the round ligaments extraperitoneally into the abdominal wall, called internal Alexander operations, are: (*a*) It produces a higher and more stable suspension of the fundus uteri; because the enveloping peritoneum is freely used to reënforce the strongest portion of the round ligament, and the traction is made directly forward, instead of in a more lateral and circuitous route. (*b*) In order to draw the liberated round ligament extraperitoneally into a specially made channel between the various layers of the abdominal wall, as a substitute for the inguinal canal, it must be divested of its peritoneal coat for some distance; and this is often not possible on account of connective-tissue infiltration from previous inflammation, and, therefore, this technic will not be available for the worst cases.

In those cases where the cervix descends far forward in the vagina, it is retroponated by stitching loops, with linen or silk, in the sacro-uterine ligaments near their attachment to the cervix, before the round ligament loops are implanted into the abdominal wall. In those multiparæ with a relaxed abdominal wall from separation of the recti, the membranous web between them is exsected and the muscles with their aponeuroses are united in the median line. In cases of excessive fat within the abdominal wall, this is reduced by taking off semielliptical or wedge-shaped masses, on both sides before closing the abdominal incision. A pessary is never used after this operation.

In making reports of the results of retroversion surgery in the past, namely, four times(3) for my bi-inguinal or extended Alexander operation, I have maintained, that both the subjective and objective findings in each case must be carefully obtained in order to accept it as of full clinical value. A mere statement of a patient about what she knows and what she thinks of her state of local and general health, is of some value and may be accepted for what it is worth, like circumstantial evidence in court. But a careful examination two years, or more, after the operation is the important requirement for obvious reasons—to supply direct and positive evidence in the court of science.

The cases comprised in this report were practically all private patients. A good share of them, when leaving the hospital, promised to present themselves after an interval of two years, or more, for examination. Previous experience in four successive "round ups" of patients for a similar purpose has suggested this. Therefore, I have succeeded in making an examination in 127 cases, with only thirty-seven cases heard from by letter, out of a total of 251 patients

upon whom this particular method was employed during the five years covered by this report. A small number having been treated by my former bi-inguinal or extended Alexander method, chiefly when some impending or fully formed inguinal or femoral hernia was waiting for an incidental cure. In these cases the vermiform appendix was either omitted or taken out by a separate McBurney incision at the time. Of the remaining eighty-seven cases nothing could be found.

Among the total number occurred the following deaths: There from embolism: (*a*) A multipara, forty-one years, fairly nourished. She had a curetment, amputation of the cervix, laparotomy for removal of left tube and ovary and appendix, resection of right ovary, and a round ligament suspension of the uterus. This patient left the table in good condition, made a smooth convalescence and felt well enough to get up after seven days, when she suddenly died in twenty minutes of an unknown cause. (*b*) A slender virgin, twenty years, domestic, not anemic, and a normal heart, had a curetment, laparotomy with resection and suspension of one ovary, round ligament suspension and appendectomy performed, without the least shock or hemorrhage. She awoke from the operation with unusual restlessness; but her condition was very satisfactory until eight hours later when, after shaking hands with visiting relatives and assuring them of her good condition, she died without apparent cause inside of half an hour. (*c*) A para-ii, forty-three years, fairly nourished. The operation consisted of a curetment, amputation of cervix, perineorrhaphy and a laparotomy for exsection of both tubes and round ligament suspension of the uterus. There was no undue loss of blood, no shock. Convalescence uninterrupted until the tenth day, when she died in thirty minutes. (*d*) A case of peritonitis due to a leak of the bladder from accidental injury the result of many ligations made specially to obliterate unusually large and numerous veins in the broad ligaments. I have since then abstained from such special ligating of veins, because it is unnecessary, when the uterus is drawn up high. (*e*) A case of acute dilatation of the stomach which was not relievable by lavage nor by changing the position of the patient. The general toxemia following was partly manifested by a comatose condition for three days before death.

In all the cases subjected to the round ligament suspension, neoplasms of the uterus and of the ovaries were removed in nearly 7 per cent. Prolapse of the uterus was present in a little over 8 per cent. In nearly all of these cases the sacrouterine ligaments were shortened. A curetment was made in nearly all cases.

Amputation of a pathological cervix was done in 17 per cent. Perineorrhaphy in 23.5 per cent. The Emmett trachelorrhaphy and anterior colporrhaphy were each performed in only two cases. Marked adhesions to either uterus or appendages were present in over 15 per cent. A tube and ovary of one side were removed in 29.5 per cent. Both tubes were exsected and removed, usually with one ovary, in 12 per cent. One ovary was resected in 45 per cent. Both ovaries resected in 19.5 per cent. Salpingostomy was made, mostly on one side, in only 4 per cent. of all cases. The vermiform appendix was removed in 87 per cent. Pathological conditions of varying character were present in more than half of these cases. Appendicitis obliterans was found in a few cases only. Cholecystostomy and epigastric exploratory incision were made several times.

Results in 127 cases examined and thirty-seven reported by letter, after an average observation period of three years, seven months and ten days. Among these 164 cases, twenty-two became pregnant. Of these fifteen were examined. Four of these aborted, in one case due to a railroad accident. In all of these the position and condition of the organs and the pelvic and general health are good, except that one of the fifteen is pregnant two to three months with organs in good position, but has pulmonary tuberculosis. The remaining ten of the examined cases gave birth to thirteen children. One of these had two severe forceps deliveries with severe infection the second time and a resulting return of retroversion and bad lacerations. The eleven other labors in nine patients were normal aside from two breech presentations. The position and condition of their pelvic organs and their pelvic health is ideal, and their general health is rated as good or excellent. Of the seven cases of pregnancy, "reported by letter," each had one child with normal labor; and one reports as "health improved," but all the others report as in good or excellent health.

The total number of pregnancies was twenty-five, of which four aborted. In every one of these 127 cases examined, except two, the uterus was in ample anteversion to be driven forward, invariably, by intraabdominal pressure, even in the recumbent position. In about 7 per cent. of these cases, however, some minor defects or departures from the normal were found, due either to elongations of the sacrouterine ligaments, so that the cervix, descended in the vaginal canal too far; or due to anchoring of the round ligaments too far away from the symphysis pubis so that the fundus, although it was up near the abdominal wall, was not in as good anteversion as it would have been with a lower implantation. These mistakes

have not occurred in my later work. In two cases (1.6 per cent.) there was a return of displacement for ample cause; in one, from overdistention of the bladder for two days after operation; there was also a primary infection of the wound; in this case the uterus was down when the patient left the hospital; the other case is one above reported among the results of pregnancy. In sixty-one of the examined cases, or 48 per cent., the *condition* of the uterus and appendages is so ideally good, subjectively and objectively, there being no pains or aches or abnormal discharge at any time. The term "excellent" may be properly applied to these cases. In fifty-one of the examined cases, or 40 per cent., the *condition* of these organs is objectively good, and the patients consider themselves well in those parts; but they have minor pains and, at times, leukorrhea. They are, therefore, classified as "good," while in fourteen, or 11.2 per cent., of them these symptoms are more pronounced. They are not disabled for their occupation, but are classified as "improved." In one of the examined cases, 0.8 per cent. the operation was done for a pronounced retroversion in a young lady with beginning melancholia. Her pelvic symptoms were improved, but the mental derangement continued and later became worse. I class this case among the unimproved. Likewise among the thirty-seven cases whose report, by letter, has to be accepted, there is one case of marked neurasthenia, that does not admit having derived any benefit from the operation; this makes two cases, or 1.6 per cent., of all the reported cases as subjectively unimproved although the displacements are cured. After deducting the seven pregnancy cases, reporting by letter, as in good or excellent health, the twenty-nine remaining letter cases reported as follows: Ten, pelvic and general health "excellent;" fifteen, general health "good." One has good pelvic health, but has a ventral hernia; one, good health except for tuberculosis; two do not admit having been benefited, because of prolonged scanty menstruation or amenorrhea.

CONCLUSIONS.

(1) Retroversion of the uterus *per se* is an anatomical anomaly that gradually produces discomfort and has an inherent tendency to invite more serious displacement or inflammatory processes in the uterus and more so in the ovaries. Those who deny this, affirm it by their own action when they correct this displacement, incidentally only, while claiming to be operating chiefly for its complications. (2) The evil effect is produced by the embarrassment to the venous circulation, caused by torsion of the broad ligaments and by traction in descent of the uterus. (3) Clinical observation and experience

indicate that the competency of the veins in the parametrium becomes impaired by the impediment when it is severe or long enough. With such a condition liable to be present, the best clinical results are obtained by not merely correcting the version of the uterus, but by adding also an overcorrection in the sense of a harmless suspension at a higher level than it normally occupies within the true pelvis. (4) One of the best operations to accomplish this is the Gilliam operation, provided that a generous amount of the enveloping peritoneum is utilized to reënforce the round ligament loops, which must be anchored in the recti muscles and their aponeuroses not more than 3 to 4 cm. from the border of the symphysis pubis, and should be drawn up so that the peripheral, unused, part of the round ligament and also its uterine origin come into apposition with the abdominal wall. (5) The efficiency of this operation is shown in the 127 examined cases, including the double test of pregnancy of twenty-one cases, all of whom experienced natural labors, with a return of displacement in only 1.6 per cent., with both pelvic and general health "good" or "excellent" in 88 per cent. There was improvement in 10.2 per cent. and no improvement in only 1.6 per cent. out of a total number of 164 cases observed from two to seven years, or over 3.5 years on an average. Its harmlessness is shown by the utter absence of any deleterious effect in the twenty-one births noted; likewise, from the absence of intestinal complications and other discomforts.

SHORTENING OF THE ROUND LIGAMENTS BY TRANSVERSE SUPRAPUBIC INCISION.

BY

SIGMAR STARK, M. D., F. A. C. S.,

Cincinnati, Ohio.

(With eleven illustrations.)

AT the meeting of the Mississippi Valley Medical Association, held at Cincinnati, October 29, 1914, it was my privilege to present a paper on the operation about to be described. Since then I have come to realize by experience that the steps of the same could be simplified. For this reason, and the fact that it has given me such

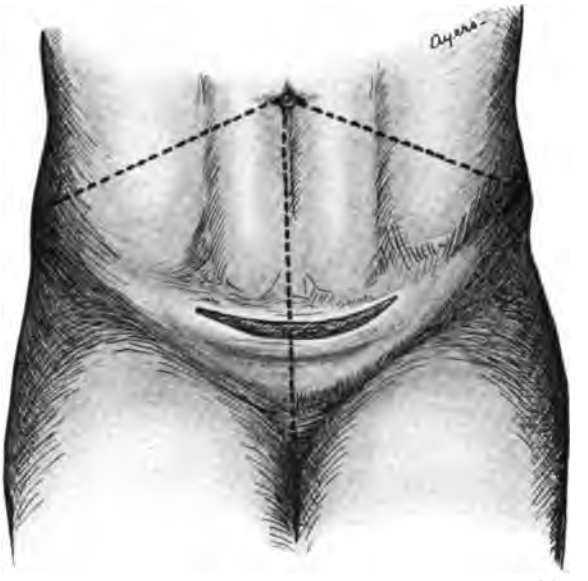


FIG. 1.—Shortening the round ligaments by transverse suprapubic incision.

satisfactory results in curing retrodisplacements of the uterus and holding the organ in perfect suspension after the usual operations upon the cervix and outlet in cases of complete prolapse, do I assume the liberty of presenting the subject for your consideration.

The adage, "there is nothing new under the sun" is applicable now. The operation presents features embodied in many different methods, but in its purpose and ensemble presents sufficient essentials to entitle it to individuality. The principal feature though is a

Goldspohn derivative and consists in the inguinal liberation of the round ligament from its peritoneal investment to the necessary degree. The transverse suprapubic approach is that of Duret, Peterson, Rumpf, Palm, Küstner and many others. I have always been partial to the Goldspohn procedure and up to the autumn of 1913 employed it in a routine way. I did not limit the Goldspohn operation to uncomplicated retrodisplacements, but successfully employed it in those complicated with adhesions and tuboövarian disease, performing salpingectomies, oöphorectomies and conservative operations upon these organs, also frequently removing the appendix as a necessary or prophylactic measure. It was at such times

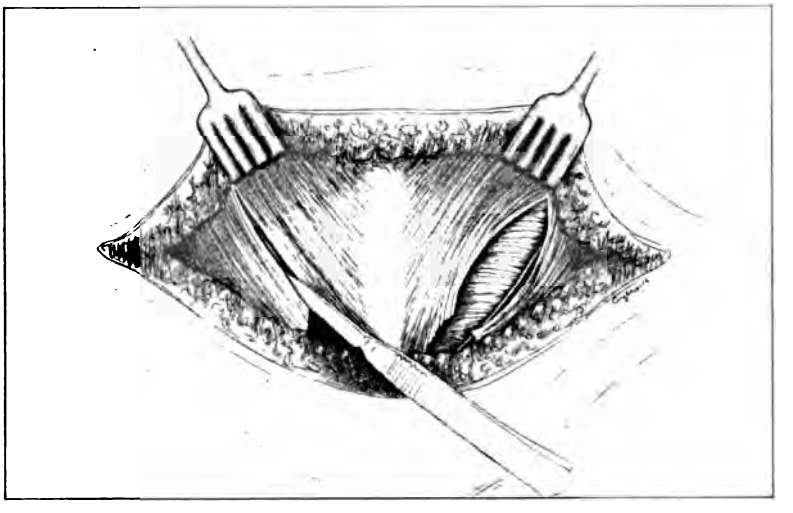


FIG. 2.

that I was frequently apprehensive because of bleeding in the depth and the greater difficulty of the operation and wished that I had made a median incision. In order to more readily cope with these possible contingencies, I took recourse to the transverse suprapubic incision, which in case of need could be terminated in the Pfannenstiel manner or even by the Peterson median incision after slight dissection of the upper wound flap from the underlying fascia.

A transverse incision down to the fascia is made just above the pubes and then carried upward on either side to correspond to the direction and length of the inguinal canal. Hemostasis is attended to and all attached fat in the line of the future fixation of the round ligaments is removed from the fascial surface. An incision about

five centimeters in length is made through the aponeurosis of the external oblique in the direction of its fibers and corresponding to the inguinal canal.

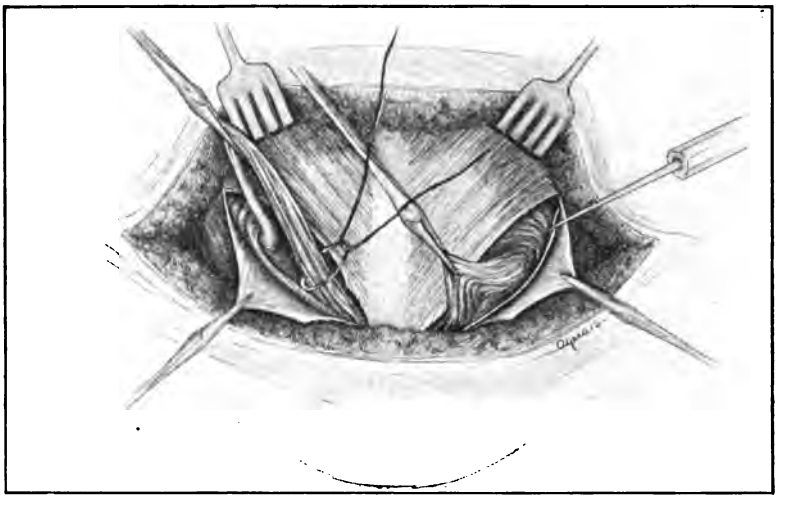


FIG. 3.

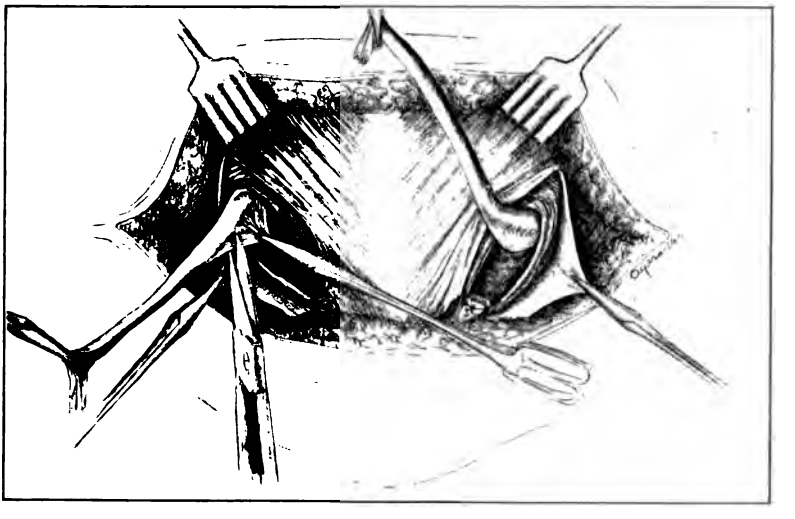


FIG. 4.

The round ligament is caught up in a hemostat, completely liberated from its bed, a ligature passed about its distal end and then sectioned immediately above the ligature. By making traction on the

ligament in an outward direction with the assistance of the hemostat its peritoneal reduplication is brought into view. This is snipped into with scissors and the incision contniued along the ligament on

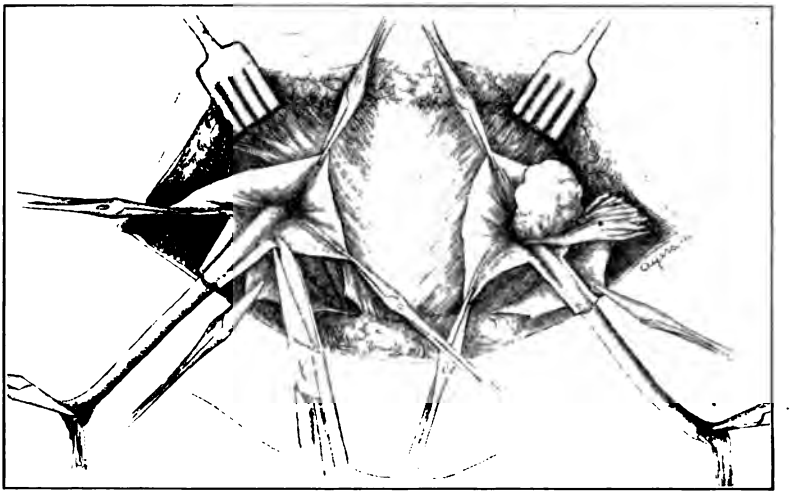


FIG. 5.

FIG. 6.

either side to the desired height, and the same procedure is then carried out on the other side. The index finger is then inserted into each opening for the purpose of exploring the pelvic organs and to

determine the amount of slack that must be taken up in the round ligaments while the assistant makes traction upon them. In order to fix this, a hemostat is placed upon each ligament at the point of its

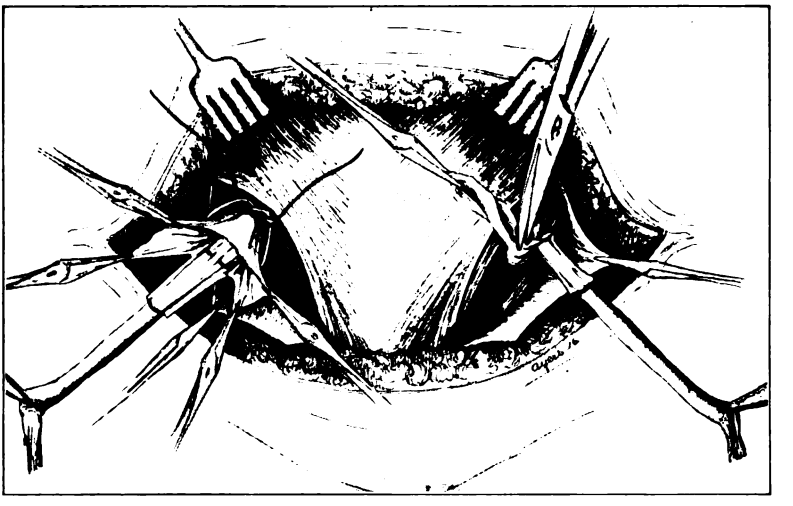


FIG. 7.

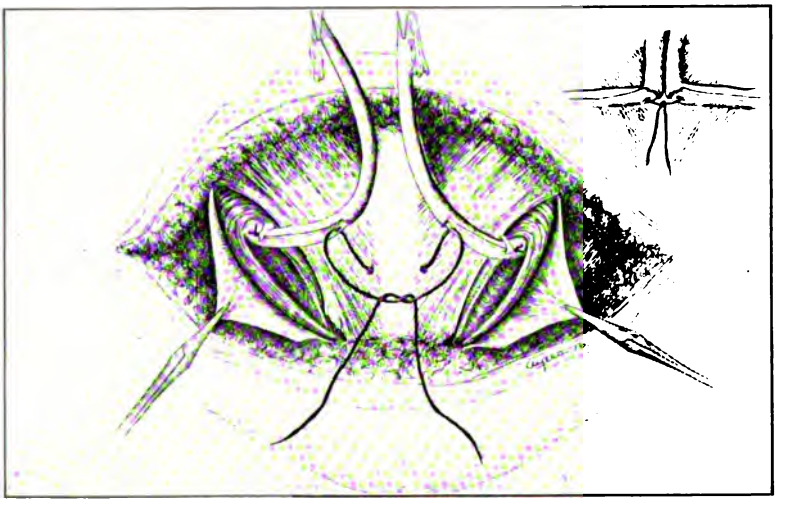


FIG. 8.

excess. If no grave pelvic condition is present and the amount of shortening has been determined upon, the peritoneal opening is closed. This is accomplished by catching its borders on either

side as far up on the ligament as possible with a hemostat, transfixing one side low down with a catgut suture which then passes through the upper surface of the round ligament and finally includes

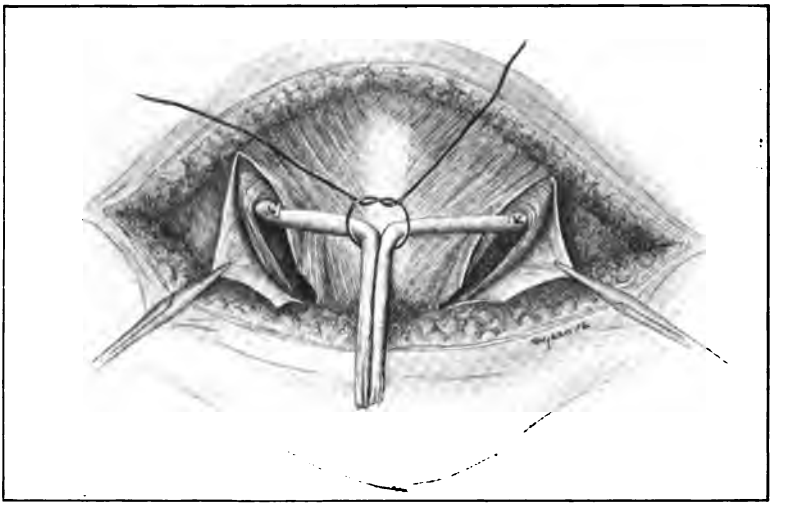


FIG. 9.

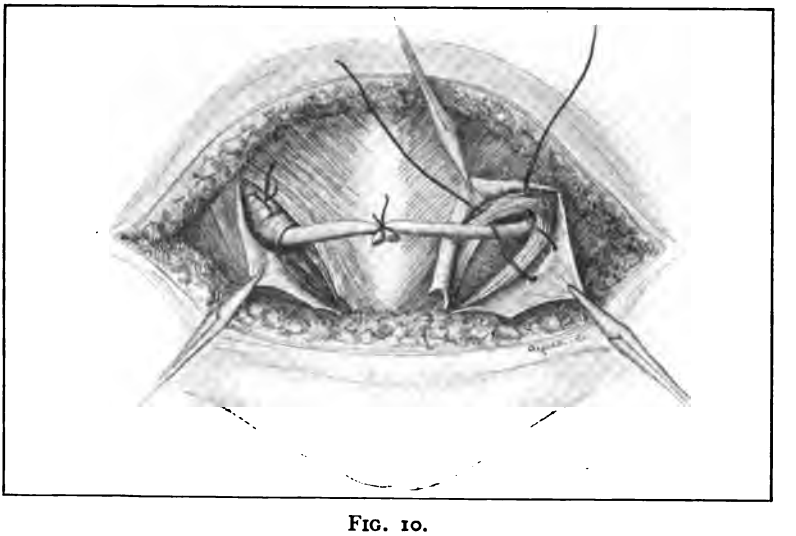


FIG. 10.

the peritoneal edge adjoining. The suture is tied after passing behind the hemostats holding the peritoneum and the excess of peritoneal tissue snipped off. The round ligaments are then fixed

just above the pubes in the median line by passing a suture through one, transfixing the abdominal fascia and carrying the suture through the other ligament and tying and then passing the ends forward underneath the fixation hemostats, thus completing ligation of the ligaments, the surplus of which is cut off. To guard against any possible weakness at the site of the internal ring, the conjoined tendon is fastened to Poupart's ligament by suture. As is my custom when operating for hernia, I employ the reverse mattress suture for this purpose, for the reason that no suture material is interposed between muscle and ligament and a better coaptation is obtained.

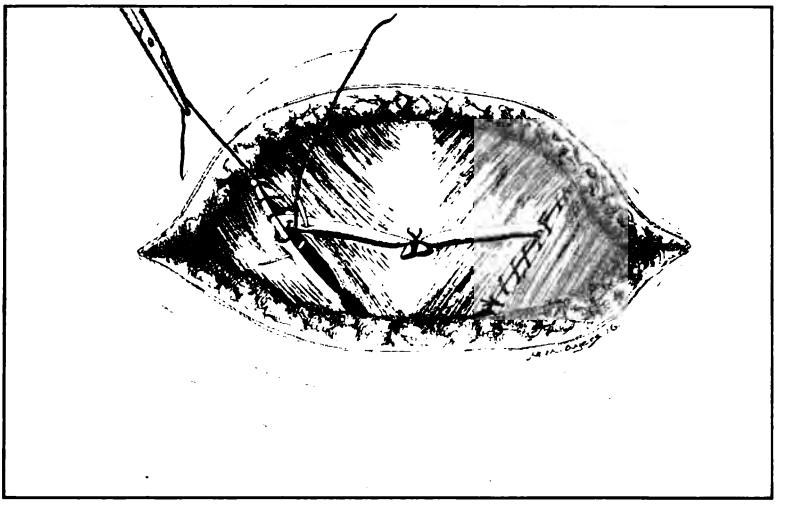


FIG. 11.

The operation is completed by separate suture of the external oblique aponeurosis and suprapubic wound, the suture of the aponeurosis including the borders of the round ligaments.

Should the examining fingers which have been introduced into the abdomen detect the existence of serious adhesions, tuboövarian disease or other complications, the median incision of Peterson may be resorted to or the lower ends of the external oblique incision joined by a transverse fascial incision and the abdomen opened in conformity with the procedure of Pfannenstiel. Disturbances within the pelvis are eliminated and the abdomen closed according to the method peculiar to the Pfannenstiel incision. The round ligaments are then attached to the fascia in the manner previously described.

A few of the cases in my series belong to the complicated class, having been associated with pyosalpinx, ovarian abscess and extensive adhesions. It is particularly in this class of cases that the value of this procedure becomes evident, as it enables you to readily cope with complications very difficult to overcome with the bi-inguinal incision.

Additional advantages are to be found in the greater ease with which the round ligaments are exposed, the greater rapidity with which the operation can be performed, the employment of a single incision, and the fact that the best part of it is hidden by the pubic hair, and that the pull is in a forward, in place of lateral, direction.

In going over the literature on the subject I found that invariably when the transverse incision was employed the operator did so with the premeditated intention of entering the abdomen and employing for this purpose either the Peterson, Pfannenstiel or Liepman incision. The only exception to this is in those obsolete methods where the operators (Doleris, Casati, Duret) sought to modify the original Alexander-Adams operation without its Goldspohn modification, without which to my notion the Alexander operation is worthless.

In the operation just described the purpose is to avoid this aggression unless demanded, and in that event to be prepared through the character of the incision for such a contingency. The fixation of the ligaments to the fascia in the midline in place of to Poupart's or the fascia in the line of the inguinal incision and other features embodied in the technic are further apologies for the essayist's encroachment upon the time of the Fellows of this association.

DISCUSSION OF THE PAPERS OF DRS. GOLDSPOHN AND STARK.

DR. WILLIAM H. HUMISTON, Cleveland, Ohio.—This is a very interesting subject and has been presented to us from two points of view. I have had quite an extensive experience with the Gilliam operation. I have been performing it since it was first brought to our attention by Doctor Gilliam, and I have reported my results, which tally very closely with the percentages of recoveries that Doctor Goldspohn has secured.

All will remember twelve or fourteen years ago how Doctor Goldspohn vigorously advocated the Alexander operation, for which he was severely criticised. The contention was that if there were lesions in the pelvic viscera he could not correct them through this incision, but later he saw the error, and now makes a free opening and corrects all pathological conditions found in the abdomen.

In all my cases, there has been but one recurrence, so far as I know, and that was in a woman who gave birth to a child in which there was an occipitoposterior presentation; the head of the child was with difficulty rotated with forceps, and after two months her doctor brought the patient to me and I found the uterus retroverted. It is the one case of failure I have been able to find.

DR. MAURICE I. ROSENTHAL, Fort Wayne.—I have given the question of retroversion of the uterus considerable attention in the last fifteen years, and it has always occurred to me that those operations which depend entirely upon the round ligament for the proper anteposition of the uterus are faulty because they are not physiological. Now, all things being normal, nature holds the uterus in its proper position beautifully and simply, and I believe our whole trouble is that we do not understand the physiology of the proper anteposition of the uterus. One would be led to believe from the description of all these operations, that when you open the belly the round ligaments are two ropes that are tied, one end to the cornu of the uterus, and one end to the pubic bone in some way. We all know that this is the position of the round ligament when we open any normal belly. (Illustrating on blackboard.) There is no need of tension. Early in my history I opened two bellies where the round ligaments were so atrophic that I could hardly find them, and yet these women had their uteri in proper anteposition, and I believe that any operation that depends upon the round ligament solely is faulty because it is not physiological, and after twelve years of such experience as Dr. Goldspohn has given us, with such a thorough analysis, reporting hundreds of cases which he has followed from the time of operation and through pregnancy, he has receded from his operation, and I predict that in twelve years from now he will recede again because the operation is not based upon physiological conditions as we find them in nature. After a reasonably large experience with the operation I have done, it has led me to believe that my observations have been probably correct. The anteposition of the uterus is maintained by the nice delicate balance between the round ligament and the overlying peritoneum which covers the round ligaments, the bladder, the uterus, and back upon the rectum, and this nice balance results in a condition which I am going to demonstrate. (Illustrating on blackboard.) Let us say we have at this point the uterus, here the bladder, here the Douglas' pouch, and here the peritoneum. It is a matter of mechanics. The uterus is lifted forward by pressure on the peritoneum over the round ligaments as it reflects forward from the uterus and broad ligaments causing the round ligaments to bow outward as we find them in normal individuals.

DR. CHANNING W. BARRETT, Chicago.—Dr. Goldspohn's principles as set forth ought to be accepted at a gynecological meeting as a standard of efficiency. There are those who say that retrodisplacement is normal; that the uterus can be in any position, but they are not usually the men who have made a study of the subject. I repeat that his principles of support and principles of correction

ought to be accepted by this body. We might differ upon points of technic.

Dr. Goldspohn laid down principles many years ago and taught us a certain method of extension of the Alexander operation, which was very much of an improvement over the Alexander operation because of the cases that needed correction of complications, but he found complications extensive enough to give up the operation. We now have a method presented in Dr. Stark's paper that has all the objections of Dr. Goldspohn's method with a few added. I did the Goldspohn procedure for a number of years, and I much prefer it to the technic offered by Dr. Stark. I should feel that if I went back to the technic presented by Dr. Stark according to the description given, I would be going backward fifteen years. This talk about the round ligament not holding the uterus because they are not on tension is not tenable. Nothing is on absolute tension in the abdomen. We cannot say the mesentery does not hold the intestines because it is not drawn taut. We cannot say that the guy-rope of a tent does not exert traction because we do not find it drawn absolutely taut. There are other forces at work. There is the force of gravity of the rope, and the wind blowing the rope, and that may carry it in one direction or another. Nature says that these ligaments have an influence. Nature said it over again, so that finally animals that get somewhat in the upright position develop a little of the round ligament. In the human being, in whom the upright position is maintained, we have the greatest development of the round ligament. Nature said it was necessary that the uterus be anteverted and developed this ligament, which is the development of the upright position to drag the uterus forward, and it does that regardless of the fact that we do not find it in an absolutely taut position.

Dr. Goldspohn (closing).—To add a few things I forgot in reading my paper. It is very important that the anchorage you make of the round ligaments is not over 3 centimeters above the upper border of the symphysis pubis. In my earlier years I did not know that and some of the cases are not so satisfactory. There is no retroversion, but the uterus will not stand so well anteverted.

I will say in regard to the primitive Alexander operation, which professed not to invade the peritoneal cavity, I have never had any use for that ideal of superficiality; and I condemn it now. It is outside of the limits of all thorough ideas of work. But I will do a thorough bi-inguinal laparotomy via the inguinal canals without cutting anything else than skin and superficial tissues in patients who also have either a hernia or a disposition to one, either inguinal or femoral; because in closing that incision correctly I can cure these hernias at the same time. I can see no advantage in Dr. Stark's technic over my bi-inguinal operation; because, like the latter, it does not enable him to remove the appendix and to explore the general abdominal cavity. For that reason I do the bi-inguinal operation only rather exceptionally I often want to explore the gall-bladder, common duct, pylorus or the kidneys, in addition

to the routine removal of the appendix vermiformis in cases of this kind. We can do all this if we have a median incision. I have done a number of these operations by the transverse Pfannenstiel incision and anchored the round ligaments at the ends, but I do not like it. In the first place, the Pfannenstiel incision must be made quite low down if good anteversion of the uterus is to be secured, and then it does not provide good access to the appendix, unless the latter hangs down into the pelvis. In most cases it is an inconvenient if not an unsafe approach; and occasionally the appendix is found high up. I have had three cases where I removed the appendix from a point as high up as the normal position of the hepatic flexure of the colon, where the normal evolutionary migration of the colon had not been completed and the appendix had been left up at a high point. I had to extend the abdominal incision considerably in order to reach it.

The argument of Dr. Rosenthal strikes me forcibly as being such as I have heard in court. When an attorney has a bad case and has no logical argument to advance, he will put up a theory, and with a good deal of oratory will endeavor to make an impression, but the thing does not count in the end. I have never spoken of the round ligament as normally holding the uterus forward. I have never declared that I believed that the round ligament has either this or that function physiologically; but there is no reason under the sun why we should not give it a function when we have so good a reason for doing it harmlessly and changing its course from a lateral one to an anteroposterior one.

DR. STARK (closing the discussion).—I would like to go on a little bit where the previous speaker left off. I would consider it an imposition upon the intelligence of this audience were I to think anybody present believed that the round ligament had anything to do with the suspension of the uterus. I consider it entirely superfluous to discuss that phase of the subject but as the previous speaker has said, that is no reason.why it should not be used as a guy rope to hold the uterus in proper position. If we were so placed as an engineer whose engine is out of order and could definitely locate the site of trouble, and remedy the same by correcting the obvious fault that would be a different matter, but you all know that we have not arrived at a definite conclusion as to what the physiological supports of the uterus are. The three commonly accepted factors are intra-abdominal pressure, the ligamentous structures and the pelvic outlet. I believe that most of us are satisfied that intraabdominal pressure has nothing to do with the maintenance of the uterus in normal anteversion and flexion. We have retroversion of the uterus in women who have perfectly normal intraabdominal pressure.

The same is true of the pelvic outlet. We commonly find the uterus in normal position with a complete tear at the outlet. The probability is, that the factor that is responsible for the maintenance of the normal position of the uterus is the proper balance in the connective tissue plane of the uterus, the so-called retinaculum uterinum of Martin which surrounds the cervicouterine junction and ex-

tends forward, backward and laterally to constitute the pelvic fascial plane. My belief is that posterior displacement of the uterus is principally due to a congenital or traumatic deficiency of the posterior fasciculi of the pelvic fascia. About a year and a half ago Reynolds directed our attention to the influence exerted by a defective anterior fascial plane upon the cervix, displacing it forward and thus favoring posterior rotation of the fundus, which I have also frequently been able to verify.

I am sorry, gentlemen, you cannot see the purpose of this modification of the Goldspohn operation. I am sorry, too, that Dr. Goldspohn departed from his operation, because he introduced one of the most valuable surgical innovations that any member of this Association has brought before us, and some day posterity will recognize it.

THE PATHOLOGY OF THE MAJOR VESTIBULAR DUCTS AND GLANDS.

BY
JAMES E. DAVIS, A. M., M. D.,
Detroit, Mich.

(With twenty-six illustrations.)

Historical.—The earliest reference to the secretions of the vestibular glands was made perhaps by the old Greeks, Pythagoras, Hippocrates and Galen, who wrote of the outpouring or ejaculation of seminal secretion by many erotic women.

As early as 1621 Plazzoni had observed the openings of the ducts of the major vestibular glands. In 1627 Spigelius made a similar observation. Rhodius, in 1661, Rolfine in 1664, and de Graaf in 1672, also made similar observations of the duct outlets. Some of these authors described or observed the emptying of a clear fluid from the ducts.

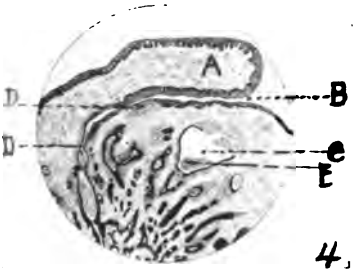
Guichard Duverney was the first to successfully demonstrate a particular similarity of openings from the ducts of the right and left glands. This observation, however, was made in the cow. He shared his find with his friend and student, Casper or Caspard Bartholinus (Bartholinus II) of Copenhagen, who was then stopping in Paris. There were three Bartholini of Copenhagen, all of whom were celebrated anatomists, and all were liberal contributors to medical literature. They were Caspard I, Thomas his son, Caspard II, son of Thomas and grandson of Caspard I. They were Danes by birth but cosmopolites in their residence, studies and knowledge of languages, being fond of travel and quite at home in Germany, Italy and France. Gaspard II was born in Copenhagen in 1655. In 1674, when but nineteen years old, he received from the king the honorary appointment as Professor of Philosophy at the University. For the next three years, he studied physics and anatomy at various universities in Europe, and in 1677 began to lecture on these subjects in Copenhagen. He was led by the celebrity of Duverney of Paris to go to that city and complete his medical education, but especially to enjoy the advantages afforded for the study of anatomy under this celebrated teacher who had graduated at Avignon when

only nineteen and was, at this time, under twenty-eight years of age. Here, Bartholinus graduated with the degree of Doctor of Medicine in 1678. But before obtaining his degree he published at Rome in 1677 his little book, "De Ovariis Mulierum et Generatonius Historia," in which appears the first account of the racemose glands which bear his name. This work was republished in Amsterdam in 1678, in Neurbaum in 1679, and in Lyons in 1696, but is at the present time one of the rare many works of the three Bartholini. In 1680, Bartholin, while studying in the Firenze Osp. S. "Maria Nuova," found a corresponding gland in a female corpse and observed there the sticky, slimy nature of the secretion. For nearly a quarter of a century he continued his studies in anatomy, lecturing regularly on this subject and on physics at the university, but in 1701, he practically retired from professional work having become greatly interested in politics. He died in 1838. Caspar Bartholin described the duct, also called ductus major Rivini and the gland (glandula vestibularis major) which is called by his name. The discovery of these structures is sometimes, however, erroneously credited to his father or grandfather. Duverney, himself in 1701, Haller, and others confirmed the correctness of Bartholin's contribution. In 1706, Morgagni contributed new knowledge of the structure of the glands and in 1775 Santorini pictured the gland apparatus. In 1745, Haller entirely denied the existence of these ducts and glands for he could find only the openings of the ducts which he plausibly considered from the mucous glands. Upon Haller's authority these glands were soon forgotten, but Sabatier in 1791, Guthrie in 1834, and Taylor in 1838, revived them again. But it was really Tiedmann's thorough work in 1840, done at the instigation of Fricke, which again reëstablished the glands and their meaning. In 1842, J. Heiberg made a very careful research of the glands and their very dilatable excretory ducts. In 1840 Boys de Loury, and in 1841 Vidal, made surgical mention of cysts and abscesses of the labia majora, but they did not clearly differentiate the cases so as to make their records of value. There had been some cases of vulvovaginal gland disease observed by Graaf, Morgagni, Boerhaave, Hunter, Astruc, Cruveilhier, Robert (M) and others. The earlier writers grouped all the venereal diseases under the general term of pox or syphilis, but for a century and a half there had been no significant anatomical or pathological work on the glands of Bartholin. The most exhaustive and thoroughly scientific work upon the glands and their ducts appeared in two contributions by Charles Pierre Huguier in 1850 and 1852.

The work of Huguier was entitled "Memoire sur les maladies des appareiles secreturs des organs genitaux externes de la femme," and covered a research upon thirty-five women and twenty-six children during a period of nine years, 1841 to 1850. Huguier called the structure the vulvovaginal gland. The International Anatomical Association (1895) has since given the gland the name "Glandula vestibula major Bartholini."

Huguier, in his first work published in 1850, briefly reviews the history of the Bartholin's glands by saying, "this gland has been recognized since the seventeenth century by such anatomists as Plazzoni, Duverney, Bartholin, Morgagni, Garengeot, Winslow, Haller, Hunter, etc., but has escaped the investigation of modern authors. He credits his friend and colleague, Robert, with a remarkable work on the inflammation of the follicles of the vulva. In this article Robert has marked the situation of two distinct follicles and orifices, but his researches were as unfruitful as those of Haller, neither having determined more than the duct meati." Huguier describes his own work as follows, "it was in 1841 at the time of my installation in the hospital at Lourcine that I discovered again the vulvovaginal secretory apparatus. It was at first, as with the ancient anatomists, the ducts which I noticed. A little later, after noticing the great consistency of the vulva in the presentation of disease and the numerous diseases with particular characteristics manifested at the point which the glands occupied, I was directed on the path of the diseases of the gland. The first time I dissected out a gland was on the body of young woman who had died of tuberculosis and who to the entrance into my service had an abscess of the left gland and a purulent hypersecretion of the same organ on the right." Huguier describes the appearance of the gland as corresponding with the description made long ago by Garengeot who had said it belonged to the order of conglomerate glands. In 1852 Huguier published in the *Journal des Connaisances Medico-chirurgicales* (Nos. 6 and 8) a new study of the inflammations of the glands of Bartholin.

In 1854 Salmon described a canalicular bartholinitis and in 1860 Aubans denied the existence of inflammation of the Bartholin ducts and glands. In the following year, however, Beaton denied the latter's conclusions and showed that a blennorrhagia might remain localized in the excretory canal of the vulvovaginal gland after having abandoned the vagina and from this source a recurrence might take place. Beaton's work was corroborated in 1865 by Zeissl of Germany. In 1867 the annual report of the second division of hospitals of



FIGS. 1 to 7.

Copenhagen by Virchow and Hirschen mentions that their diseases of the vulvovaginal glands originate in the excretory ducts, but exhibit disease manifestations nearly always in the glands. Biegel, in his large work, also misunderstands the relation of diseases of the ducts and glands and uses the appellation "Inflammation of Bartholin Gland" without differentiation.

In 1873 Marschal wrote a thesis on abscess of the vulvovaginal gland and recognized the better findings of previous workers and further showed for the first time the production of rectovulvar

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FIG. 1.—(Redrawn from Huguier's Mémoire.) The relation of Bartholin's glands to the vagina. *a*, *b*, Duct on the right side is occluded and cystic, forcing the gland which is enlarged further out than usual. The duct on the left side is markedly cystic. The glands ordinarily are in the adipose tissue just external to the vagina and are partially covered by the band of muscle shown in the drawing. The glands are shown in close proximity with the pubic rami, and slightly posterior to a line drawn from the posterior commissure.

FIG. 2.—(Redrawn from Huguier's Mémoire.) The gland and part of the duct which is cystic have been dissected out, the gland being entirely freed but the duct is shown still partly attached. *A*, Labium majus; *B*, labium minus; *C*, urethral orifice; *D*, Bartholin's duct; *E*, sulcal tissue pulled outward between the labium majus and minus; *F*, the outer margin of the gland.

FIG. 3.—(Magnification two diameters.) This section is cut through the whole of the duct and carcinomatous growth which is primary in the gland as shown in Figs. 3, 4, 5. A portion of the tumor is removed from the *F* side and there is a crack in the growth due to an incision during the fresh state. *A*, The labium majus; *B*, the labium minus; *C*, the gland duct; *D*, the hymen; *E*, vaginal wall; *F*, carcinoma.

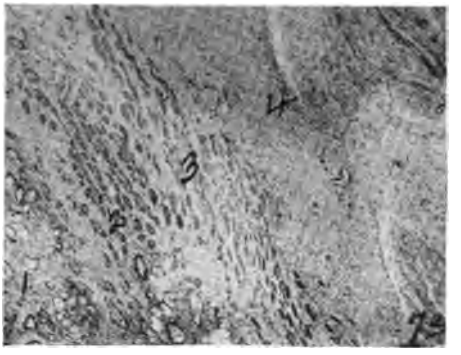
FIG. 4.—(Magnification thirteen diameters.) A microscopic section showing a longitudinal section of the duct. The stratified epithelium is distinctly seen but in places it is very thin. The duct proper is seen throughout but the innermost parts of the duct are seen merging with the cancer tissue. *A*, Hymen; *B*, duct orifice; *C*, a cystic area; *D*, *D*, areas of epithelium which are very thin; *E*, mass of cancer cells.

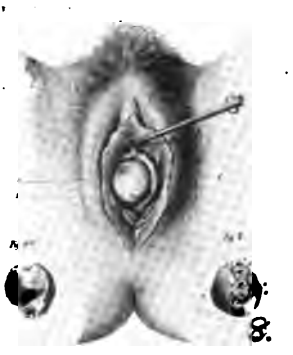
FIG. 5.—(Magnification fifty-six diameters.) This section is a part of the tissues in Figs. 3 and 4, showing a deep part of the duct with one large and two small masses of carcinoma cells. The inner (left) wall of this part of the duct is lined above with stratified epithelium and below the middle with well-marked columnar epithelium at *A*, and at the bottom with one or two layers of cuboidal epithelium; the outer (right) wall is lined above with stratified epithelium, then for a small distance by columnar epithelium, and below again by stratified epithelium, which appears thick owing to obliquity of the section; the cells are vacuolated and have desquamated below. A large mass of cancer is seen on the right of the section, with columnar or cuboibal peripheral cells and degenerated central cells lying in a cavity. Two smaller masses of cancer are also seen, and marked round-cell infiltration at *B*.

FIG. 6.—(Magnification nine diameters.) A section through the entire Bartholin gland. *a* gives a clear idea of a lobule composed of many small glands and partially separated by stroma from the neighboring gland elements. At *b* are sections of the lobule's terminal duct. At *c* and *d* are sections of larger ducts.

FIG. 7.—Terminal ducts in Bartholin's glands. *a* is a secondary duct dividing into four terminal ducts. These are lined by cuboidal epithelium. At several points the small glands are seen opening into these terminal ducts. The appearance of many layers of cells at *b* is due to the obliquity of the section. The major number of the glands are tubular. The gland epithelium is high cylindrical with the nuclei at the base.

fistula. In the same year Gosselin set aside for this affection one of the clinics at Charity Hospital and Diday and Doyon in their





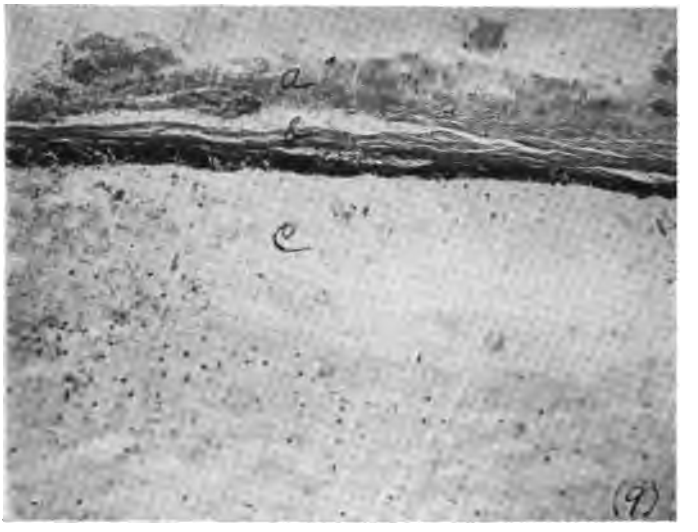


FIG. 7*a*.—(Magnification sixty-four diameters.) At 1 is shown the conglomerate gland structure. At 2 unstriped muscle fibers. At 3 striped muscle fibers. At 4 connective tissue.

FIG. 8.—(Redrawn from Huguier's Mémoire). A cyst of the left Bartholin duct. A probe is shown in the urethral orifice. At *a* is the cyst separated and pulled out from the gland turning the inner end outward. Fig. 2 shows the cyst with severed duct openings. Fig. 2 bis shows the cyst laid open.

FIG. 9.—The wall of a cyst of Bartholin's duct. At *a* is shown partly cornified epithelium which is separated by drying from the cyst wall at *b*. At *b* is the cyst wall containing muscle elements and at *c* cellular débris of the cyst.

"Traite de Therapeutique des Maladies venerienes" reserved a place of especial importance for bartholinitis and remarked about the

influence of menstruation on the recurrence of the symptoms. In this same year Schweizer was the first to describe the metaplasia of the duct epithelium in Bartholin's gland. This was confirmed by Sitzenfrey in 1906. A like confirmation was made by Touton and by Noebel.

In 1878, John Morris, of Baltimore, asserted that gonorrhea was a frequent disease in little girls. Pott's article in 1883, and Czeris in 1885, added conclusive proof of gonorrheal vaginitis in children.

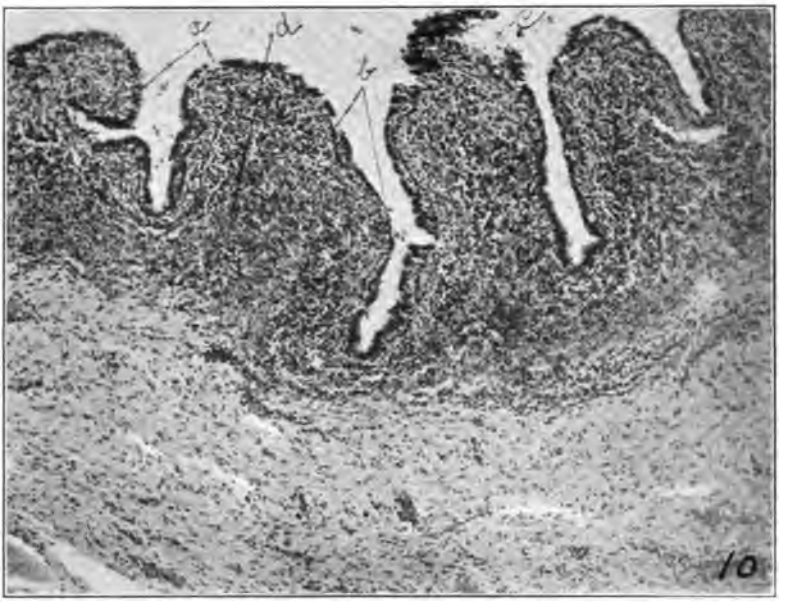


FIG. 10.—(Magnification sixty diameters.) The wall of a cyst of Bartholin's duct. At *a* are areas of epithelial exfoliation. At *b* areas of epithelial metaplasia. At *c* marked desquamation. At *d* and along the entire subepithelial zone there is marked mononuclear infiltration. The picture is typical of gonorrhea.

In 1891 Epstein described three cases of gonorrheal vaginitis in the new-born which he said usually lasted two or three weeks. Cassel in 1893 describes such a discharge persisting from birth until eighteen months of age. Hamilton quotes Holt as saying the nonspecific cases number less than 5 per cent. In Hamilton's table of 1972 cases of vulvovaginitis, 0.15 per cent. showed bartholinitis. Pollack reported 1.6 per cent. of her cases of vulvovaginitis in children exhibited Bartholin's abscess. Bartholin's abscess occurred in 20 per cent. of the cases that were pregnant. In 1880 Duncan wrote that

vulvitis was a disease of infancy, vaginitis a disease of maturity, and that vulvitis in children generally occurred as a consequence of cold, it being liable to recur and was seen as often among the rich as in the poor. In 1908 Hamilton, and in 1909 Pollak, further contributed to the knowledge of vulvovaginitis in children. Hamilton says through ancient history and up to the end of the middle ages gonorrhea was apparently recognized in its true character as a

FIG. 11.—(Magnification sixty diameters.) At *a* is a dilated duct of Bartholin's gland enclosing cellular débris and showing at one place both desquamation and metaplasia of epithelium. At *b* is seen another cystic dilation of one of the ducts with less marked changes of the epithelial cells. At *d* and *c* are shown smaller ducts becoming cystic. At *e* is seen a gland acinus with well-marked cystic dilatation, the cells being of the goblet type.

specific and communicable disease, but the awakening of medical science during the fifteenth century had the curious result of obscuring rather than enlightening this particular field, and gonorrhea came to be hopelessly confounded with syphilis. Hunter's famous inoculation experiments (using a mixed infection instead of a pure syphilitic virus he produced both gonorrhea and syphilis) befogged the question, and it was not until well on into the nineteenth century when chiefly

by Ricord's work the two diseases were differentiated. A second and a third stage in gonorrheal history followed this and was concerned in the controversy over its specificity and infectious character. The problem was cleared when Neisser in July of 1879 described a micrococcus discovered by him in blennorrhagic secretions of the urethra and attributed to this microörganism the preponderant rôle in the etiology of this disease. This may be said to mark the beginning of the bacteriological epoch, for papers before this period had mainly to do with symptoms and treatment.

FIG. 12.—(Magnification sixty diameters.) A section of Bartholin's gland showing cystic changes in both ducts and acini. At 1 is the dilated duct. At 2 and 3 dilated acini. At 4 unstriped muscle fibers.

In 1882 Leistikow first found gonococci in the vulvovaginal diseases, and his discovery was confirmed a year later by Arnig and shortly after this by Weilander, who discovered the gonococcus in the abscess pus of Bartholinitis. In the following year, Martinean and his pupil, Gogul, re-edited the work of Weilander and Arnig. Later researches and controls by Bumm gave additional proof. Bumm and Sänger, about this time, showed that abscess formation was accompanied by mixed infection. It is interesting to note at this time that in 1885 Langelbert attributed Bartholinitis to spon-

taneity or to excessive coitus. In the same year Scoot reported calculi removed from cysts of the vulvovaginal gland.

In 1886, Fauvel, in his inaugural address on the chronic inflammations and the vulvovaginal fistulæ, contributed a complete work summarizing the knowledge to date and describing specifically the operative technic.

In 1887 and the succeeding twelve years, the literature of Bartholinitis was greatly enriched by numerous bacteriological contributions. Among these may be mentioned the work of Bumm in

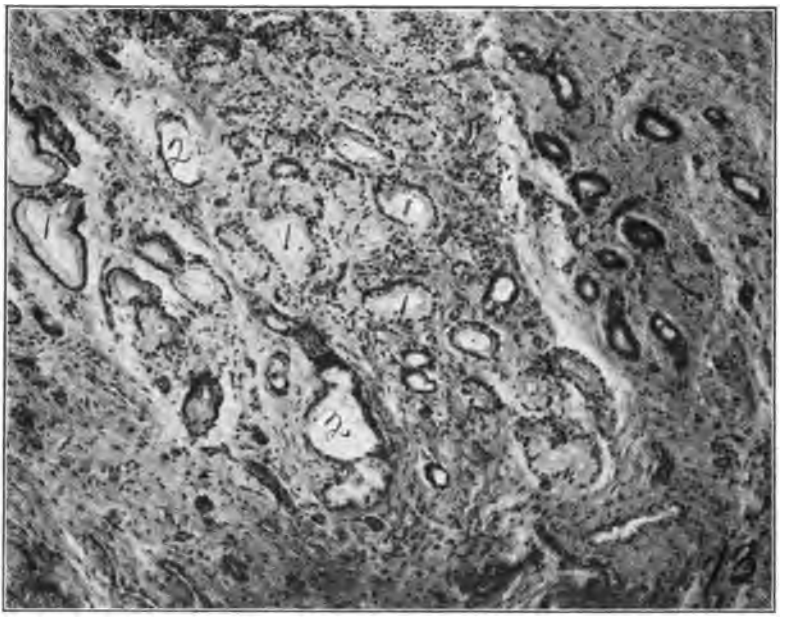


FIG. 13.—(Magnification sixty diameters.) A section of Bartholin's gland. At 1 showing dilated acini with goblet cell formation. At 2 dilated glands with marked epithelial hyperplasia.

1887, Labusquier in 1890, who claimed that the gonococcus was the sole cause of bartholinitis. Veillon in 1893 described a case of Bartholinitis due to anaerobes and Menge in Germany, Dujonc in France, ascribed it to other pus-forming organisms as streptococci, staphylococci and colon bacilli. In 1898 Halle in a thesis on the bacteriology of the female canal, showed that anaerobes might exist alone or with gonococci. In 1899 Colombini admitted that nearly all cases of Bartholinitis have a gonorrheal origin, but the gonococci are nearly

always associated with other microörganisms as the staphylococci, streptococci and the colon bacilli. He thought it certain, however, that some cases of inflammation of the vulvovaginal gland could not be proven to have an association with gonococci. Mizot and Foster in the same year came to the same conclusions.

In 1888 Chevalerais, cited by Bonnet, distinguished the cysts from the abscesses of the gland, and Sänger described the lesions of the glandular orifice of the canal. Verchere in 1894 gave many pages of his book "The blennorrhagia in women" to Bartholinitis, and de-

FIG. 14.—(Magnification sixty diameters.) A portion of the wall of Bartholin's duct. At *a* the columnar epithelium is changed to the squamous type. At *b* there is desquamation of epithelium. At *c* is shown the greater depth of stratified epithelium because nearer the duct orifice.

scribed clearly and precisely the ulcerative process which leads to fistula. Garofalo extolled the treatment of compresses soaked in ichthyol, Cordier the interstitial injection of salicylic acid in saturated alcoholic solution, while Druelle in 1904 preferred cauterization by the thermocautery to the enucleation of the gland. Bärensprung, Fricke, Tiedemann and Huguier all observed that cysts, condylomas, and fibromas at times caused pressure which produced atrophy of the major vestibular glands.

In 1892 Müller gave a résumé of the literature of the development

of Bartholin's gland pointing out that they were first recognized in the fetus when it has attained a length of 4.5 cm. They are seen at this time as solid cords passing off from the sinus urogenitalis. Cullen reports that Pohlman, working in Mall's laboratory, found that the beginning of Bartholin's gland becomes apparent just as soon as the first differentiation of the sex appears externally. It being formerly thought that this was demonstrable about the fourth month, but Pohlman found it in embryos 2 cm. in length. The glands at this time consist of simple pouchings out at the side of the urogenital sinus. This gland was observed to be slower in development than the male gland and its origin is probably ectodermic.

Bergh in 1895 states in his notable contribution upon "Inflammation of the Major Vestibular Glands," that the abstract of the "Handbuch der Frauenkrankheiten," edited by Hildebrandt, first emphasized that inflammation of the excretory ducts was most often observed, and that the glands themselves were seldom involved. This same view was also taken by Schwarz and by Jadassohn. On the contrary, Wolff and Lang declared the gland played the important rôle.

In 1896 Cumston speaks of the physiology of Bartholin's glands, referring to the secretion of these glands having the function of lubrication during coitus and maintenance of moisture of the parts during the coital act. It also preserves the orifice of the vulva against the irritating action of the genito-urinary secretions. He denies Biuschke's contention that this liquid gives a physiological aid in labor saying the amount secreted would be far too small to be of any decided importance. Atrophy of the glands proceeds gradually with the decline of sexual activity and consequently diseases of these glands become more infrequent after the menopause. This author believed too much of the pathology of Bartholin's glands has been attributed to the gonococcus, but he agrees that this organism certainly predisposes tissues to undergo a secondary infection.

In 1904–05 Miller pointed out that occlusion of the duct of the Bartholin gland is subsequent to acute inflammation, and that acute inflammation without the retention of the secretion and pus formation will differ widely from acute inflammation where secretions and inflammatory products are retained within the duct and gland both as to symptom-complex and to subsequent outcome. In 1905 Cullen observed that the Bartholin duct, after leaving the vagina, gradually increases in diameter in the vicinity of the gland, then divides into secondary ducts and these in turn divide, forming terminal

ducts which drain the secretion from the lobule. He also observed the formation of very small multiple cysts in the terminal ducts.

Sitzenfrey in 1906 was perhaps the first to report a prolapse of the right side of the vaginal wall following a radical operation for carcinoma of Bartholin's gland. He also described carcinoma developing upon the site of epithelial metaplasia and as a result of previous gonorrheal infection.

Felix reports finding the solid buds of Bartholin's gland developing from the dorsal wall of the pars pelvina of the urogenital sinus, in an embryo of 36 mm. and their first division was observed in one of 80 mm. (head-foot length). The first appearance of the lumen in the efferent duct was observed by Spuler in 1910, in embryos of 82 mm. (vertex-breech length). The first terminal vesicles were observed in one of 120 mm. and the first secretion in embryos from 150–160 mm. (vertex-breech length) and after birth there is a slow increase in the number of the terminal vesicles (Spuler, 1910), and after puberty there is another more rapid growth (Huguier, 1849). At the menopause these glands undergo degeneration and may be entirely wanting in old age (Tiedmann, 1840).

In 1913 Spencer reviewed the literature of carcinoma in Bartholin's glands, tabulating thirteen cases, and reporting one of his own which, with Eden's case reported in the discussion of Spencer's paper, makes in all fifteen cases. In 1915 Wittkopf reported finding but twelve cases of carcinoma of the vulva in the German literature. Wittkopf, writing in 1915, says chronic gonorrheal Bartholinitis may be the etiological factor of carcinoma of Bartholin's gland. Nobl and Borst have supported Sitzenfrey's contention.

Physiology.—Huguier says, "there exists on each side of the vulvar openings a conglomerate gland which has a special duct. The structure of this organ has a semblance to that of the lachrymal, salivary and pancreatic glands. Its tissue proper is composed in decreasing succession of lobes, of lobules, of granulations which microscopically are composed of sheaf-like forms, really tubes terminating in culdesacs, of corpuscles, of molecular granules, of a liquid transparent, thick and sometimes containing prismatic crystals. It exists before the sixth month of intrauterine life, develops principally at the age of puberty and atrophies in the old. It offers in its duct numerous anomalies, congenital and acquired which have more than once led astray certain anatomists who, in consideration of some futile researches, have denied their existence. It secretes in a very active manner only at the time of menstruation, during sexual desire, and in the act of copulation which it is supposed to facilitate.

It is closely connected with the clitoris, mucous follicles at the vulvar entrance and the ovaries."

It exists in all the quadrumanes, in the great number of digitigrade felines, the rodents; among the ruminants, in the cow. In the pachydermes it is replaced by mucous follicles.

It is incontestibly analogous to the bulbo-urethral gland of man. *Knowledge of it gives the key to many physiological phenomena which have to do with genital functions, and puts one on the path of a great number of vulvo-vaginal diseases whose cause, course and nature have been hard to appreciate.*

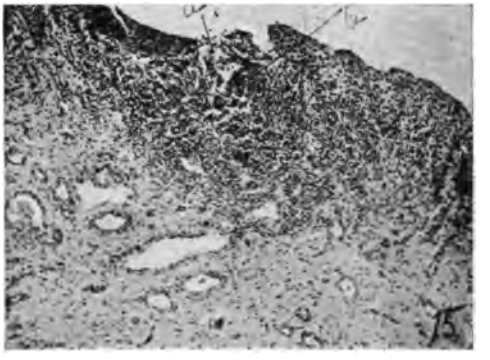
Jadassohn has claimed that the terminal acini of Bartholin's gland have a secretion, exerting a germicidal action.

Morris has said the gland secretion is formed during coitus or under lascivious thoughts, more particularly the latter. When the muscles of the perineum and vulva are stimulated to involuntary contraction the secretion is emitted in jets similar to male ejaculations. He cites three cases having involuntary emissions, one of which had as many as eight to ten in twenty-four hours. The orgasms were attended by the ejection of a fluid of a viscid glutinous character, always involuntary, and attended by a feeble, but not unpleasant, excitement.

Cumston says that the Bartholin gland secretion, in addition to rendering coitus easy, maintains the moisture of the parts during the entire act. Besides, it preserves the orifice of the vulva against the irritating action of the genito-urinary secretions. Buischke is quoted as claiming that this liquid is a physiological aid in labor. Cumston believes the amount of fluid secreted far too small an amount for any such function. When a woman's sexual functions are gone, the vulvovaginal glands become atrophied. Their function is lost gradually as sexual activity declines, consequently diseases of these glands are infrequent after the menopause. Neumann's statistics are quoted to show that the glands functionate most actively between the ages of seventeen and twenty-three years, and Huguier is cited as giving the ages of eighteen to twenty-seven years as marking the period of greatest activity. Cumston observes that they are rarely diseased before the age of fifteen and hardly ever after forty-five.

Bergh describes the Bartholin gland secretion as egg white like or gummy and sticky, not dissimilar to the clear secretion of the cervical canal, colorless, hyalin, alkaline or only neutral; it contains only a little mixture of epithelial cells and is not coagulated by acetic acid and contains no mucin. He has observed that the abundance

of the gland secretion seems varied with different individuals and also with changing conditions, perhaps it is greater during menstruation. In sexually excitable women the secretion can be rather copious



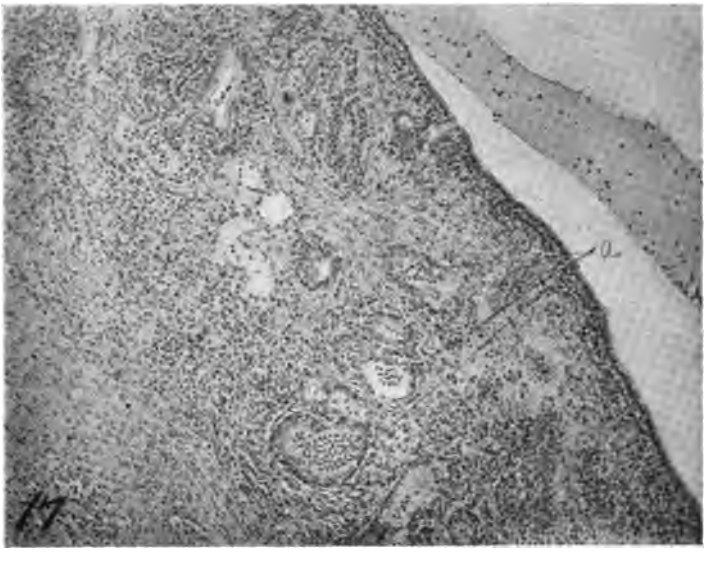


FIG. 15.—(Magnification sixty diameters.) A mixed infection of focal type in the Bartholin duct wall. At *a* the stratified epithelium is gone and at *b* is seen the center of the polymorphonuclear infiltration.

FIG. 16.—Extensive squamous-cell epithelial thickening of the ducts of Bartholin's glands after chronic gonorrheal infection. The section is made through the preglandular portion.

FIG. 17.—(Magnification sixty diameters.) Infection of Bartholin's gland. At *a* within the acini are shown masses of pus cells.

and is often poured forth by just touching the genitals. Sensual kisses, or more evident actions, or even reading erotic lectures by such individuals have been able to cause emission. Bergh suggests that

the mixing of this secretion with the out poured-semen may be necessary. Secretion by the gland apparatus has been shown in the first month after birth.

Langley and Anderson have observed stimulation of the sacral nerves in the vertebral canal, producing sometimes dilation and flushing, sometimes contraction and pallor of the vulva. In the rabbit, dilation and flushing come from the third and fourth sacral nerves, and contraction and pallor from the first and second sacral.

Gross Anatomy.—The major vestibular glands (Bartholin) are two in number and are situated in the paravaginal tissue, one on either side of the vagina, to the under and outer part on the side of the vulva in the lowermost part of the labia majora, often noticeable below and external to the posterior vulvar commissure, occasionally seeming to be fastened by a short cord to the ascending ramus of the ischium. They are between the superficial and middle aponeuroses, in the angular space which is formed by the contact of the vagina and rectum. Besides, being covered by the superficial perineal fascia, the outer side is covered by the bulbocavernosus muscle, and its upper end is partly covered by the corpus cavernosus urethræ. Individual bundles of muscles from the bulbus-cavernosus prefundus appear also to often pull the posterior or inner side of the gland (Henle). (See Figs. 1 and 2.)

The gland averages in dimensions 10–20 mm. long, 5–10 mm. broad and 5–6 mm. thick, and weighs 4–6 grams. The size varies from that of a pea to a bean or almond.

The glands are in relation above, forward and inward with the bulb of the vagina, below and within nearly in contact with the inferior branches of the hemorrhoidal veins. Outwardly they are limited by the ischium. Behind, they are in relation with the middle aponeurosis of the perineum.

Toward the lower end of the inner side, or to the inner border the gland narrows, giving off the excretory duct which in the depth of the gland gives rise to stem-branches (at most three). The duct courses obliquely, now and then giving a little turn for a distance of 15–20 mm. first in and then outward, seldom horizontally toward the wall of the vestibule, where it empties outside of the middle or lower part of the lateral caruncle or hymen at its outer side about midway between the urethral-papilla and the posterior commissure; more rarely it opens farther back, about opposite the gland itself, and more rarely still it opens above near the urethral papilla. The opening is very small, especially in the not sexually excited females and those who have not borne children. It will admit a horsehair to a small-

sized probe. The orifice is round and is usually surrounded by a very red vascular circle which serves to distinguish it from the surrounding parts.

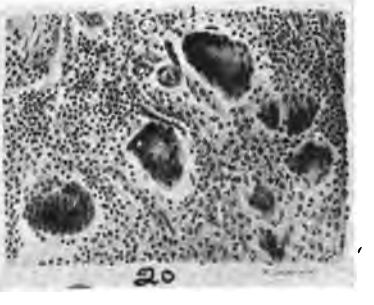


FIG. 18.—(Magnification sixty diameters.) Abscess of Bartholin's gland. The pus and cellular débris is well shown at *a*.

FIG. 19.—(Magnification sixteen diameters.) A section of part of Bartholin's gland. The glandular portion is shown upon the right side of the section. To the left of this is a sclerotic zone with perivascular lymphocytic infiltration. Well over to the left is shown a well-marked tubercular follicle containing giant cells.

FIG. 20.—(Magnification 280 diameters.) An excellent picture of tubercular infection. The lymphocytic infection is well marked throughout the section as are the epitheloid and giant cells.

Huguier, in speaking of the vaginal end of the duct says, "It is necessary to clearly recognize the precise place where the canal empties, for this, as well as the gland, is usually not recognized.

This place is covered by the caruncles or the lower hymen from whence the necessity, in order to perceive, of pushing back this part inward. It does not open perpendicularly to the surface of the vulva but rather obliquely from within and from above. Its external or semicircumference is garnished by a little falciform fold and acts like a valve formed from the mucous membrane. It is not always sufficient in order to see it, to just raise the caruncles or the hymen; it becomes necessary at times to draw down the vulvar mucous membrane downward and outward, to somehow rock or see-saw the surface to see this orifice. The opening of the duct is about ½ mm. in diameter. If it has been diseased or has passed hypersecretions it may be larger. In almost all women the entrance to the duct is surrounded by a vascular ring which by its red color serves to distinguish this part from its surroundings."

The arterial supply of the gland enters from the inner side as branches from the arteria pudendalis communis and externa.

The veins form a plexus closely woven about the gland and they empty into the external pudendal veins and then into the femoral.

The lymph vessels under normal conditions should empty into the lymph glands around the cervix uteri (Huguier, Martin and Leger), but when pathological changes involve the skin and mucous membrane with the gland and duct, lymph drainage may empty into the inguinal glands.

The nerve supply enters the outerside of the gland from the posterior labial nerve (Nervus pudendalis communis).

Huguier and Bergh describe the vulvovaginal gland, nerve supply as coming by the external face of the gland; the arteries penetrate by the internal face and the veins form a plexus about the glands.

Microscopical Anatomy.—Cullen likens the entire gland to a bunch of grapes, developed more on the one side than the other. The main duct corresponds to the stem; the secondary and terminal ducts to the branches; and the lobules represent the individual grapes.

The duct near the vagina is lined with many layers of squamous epithelium, passing toward the gland, the duct lining is composed of transitional epithelium, still many layers in thickness. In the deeper layers, the cells are squamous in type, but in the superficial layer —the one directly in contact with the lumen of the duct—they are of the high cylindrical type. Felix quotes Lichtenberg as right in saying the stem of Bartholin's gland is not an efferent duct, but a "glandular stem tubule." The lumen of this stem tubule and primary branches is developed in embryos of 65 mm. The smaller and later branches have the lumen developed at 120 mm. The

secondary ducts have a lining of transitional epithelium like the stem, but the number of layers is usually much less. The terminal ducts may be lined by transitional epithelium, but they are usually found covered by but a single layer of epithelium. Sometimes the cells are high cylindrical in type, at other times cuboidal. The glands forming the lobules are tubular or slightly racemose, are round or oval on cross-section and are lined by one layer of high cylindrical epithelium. The cells, if filled with mucus may be goblet-shaped. The cell nuclei are small, round and somewhat flattened, staining deeply, and are situated at the base of the cell. They bear a very striking resemblance to the cylindrical epithelium of the cervix. Their protoplasm does not, however, take the hematoxylin stain deeply as is so often noted in cervical epithelium. While these small glands which make up the bulk of Bartholin's glands are, for the most part, confined to the lobules, isolated glands are found here and there, opening directly into the main duct or into the secondary ducts. The elements of Bartholin's gland are held together by a definite connective-tissue framework rich in blood-vessels and in nonstriped muscle fibers. This tissue is, according to Müller, amply supplied with nerves.

Jambon and Chaboux examined glands of young adults, twenty-four hours after death and found that the excretory ducts were situated in the middle of the glands in the form of irregular canals reaching even to the middle of the acini. The epithelium cells of the duct were observed to be only half the size of the secretory cells of the acini. There were no striped muscle fibers in the gland itself, but some involuntary muscle fibers were seen around the larger excretory ducts.

Miller quoted Kölliker as saying the excretory duct wall contains a delicate longitudinal layer of smooth muscular fibers and is 2 mm. in thickness.

Colombini describes the vulvovaginal gland as compound with acini sometimes packed tightly together, or they may be strewn apart or scattered so that the gland may be seen through all the connective tissue as scattered granules and lobules. From each sinus a narrow short duct extends outward and empties into an oval widening or canal. From each of these sinuses there arises an excretory duct, these excretory ducts unite with each other to form a common excretory duct which is cylindrical or ampulla-shaped. It is usually single but may sometimes be double. Sitzenfrey says the alveoli and the little beginning canals are clothed with a single-layered low-celled epithelium. (See Figs. 3, 4, 5, 6, 7, 7*a*.)

Gross Pathology.—Anomalies of development may be exhibited in double glands upon both sides or upon one side only of the vagina. There may be but a single gland upon one of either sides. The excretory ducts may be double from a single gland. The position of the gland may vary from a situation near the clitoris to near the posterior commissure. The direction of the excretory duct and position of the meatal opening may exhibit much variation as a result of development, parturition, and disease.

The size of the major vestibular glands must be contingent upon several factors as the general normality of genital development, the degree of function enforced upon the apparatus, and the exigencies of pathological tissue changes. Bergh examined by palpation 1047 healthy women, of this number 450 were under twenty years of age, 169 were not yet eighteen, and only eighty-eight were between thirty and fifty-six years. Eighteen were pregnant and twenty-five appeared unusually sensual. Of these 1047 individuals, 146 appeared to have had diseases of the vulvovaginal gland apparatus, 61 on the right side, 44 on the left side, and 41 on both sides. In 398 of the remaining 901 cases, the glands or their ducts could not be felt plainly. In 440 of the remaining 503 individuals the glands could be plainly palpated, in 238 only on the right, in ten only on the left, and in 192 on both sides. In only 38 were the gland ducts palpable, 25 on the right side, 6 on the left, and 9 on both sides. In 298 prostitutes Bergh was able to palpate the gland ducts in 28 or 9.4 per cent. on the right side, 6 or 2.3 per cent. on the left side, 9 or 3.3 per cent. on both sides. In 137 cases or 46 per cent. the glands were plainly palpable. The glands were found palpable six times more frequently on the right side than on the felt.

The literature generally has accorded the left gland a greater frequency of involvement, but the experience of the writer confirms Bergh's statistics. The explanation of a more frequent involvement of the left side has been based upon supposed pressure of the sigmoidal colon upon the return venous supply.

My review of the literature has given no observations of the relative exposure of the two duct meati except as directed to the falciform valve formed from the mucous membrane.

In the larger percentage of my series of cases, it has been observed that there is a considerable variation in development of the nymphæ, the left showing usually a more complete development. The right nymphus has frequently been observed with but the upper third, one-half, or other fractional part completed. The deficiency always being of the lower labial part.

This causes a greater exposure of the duct meatus, thereby offering easier accessibility to pathogenic bacteria.

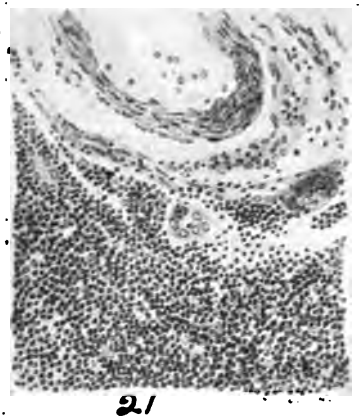
The recognition of the gross pathology of the major vestibular gland and duct is, as before mentioned, of very great diagnostic value in clinical determinations of many factors relating to the female genitalia.

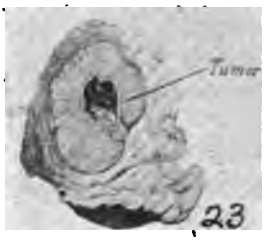
Observation of the duct opening should be made after the method elsewhere described. If the meatus is normal, its size will be observed to be very small, approximately $\frac{1}{100}$ inch in diameter, with a very slight halo of red surrounding it. If the area is purplish red like a flea bite, it may be interpreted as a sign of an inflammation which has subsided but leaves the women a menace to her society (Possi, Miller, Sänger). This has been called by Sänger "the gonorrheal macula."

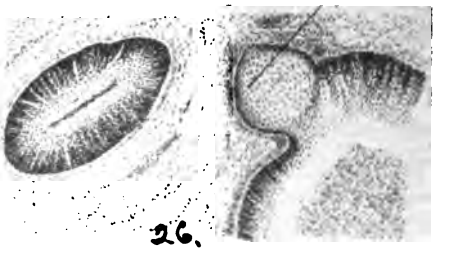
If about the position of the meatus, there is moisture and this is the only area of excessive moisture, it will be significant of some hyperfunction worthy of further investigation. In this relation one should bear in mind the factors of eroticism, onanism, menstruation, trauma and pathogenic infection. If the duct opening is widely dilated, chancres, tumors, hypertrophies, excoriations, scars or any condition tending to draw apart the aperture should have consideration.

The presence of a cyst or abscess of the duct or gland which has discharged recently by way of the duct will cause a widely pouting meatus, but in almost every instance where the meatus is distended and purplish red in color and is excreting excessively or maintains within or upon the meatal surface a drop of milky secretion, there is a gonorrheal infection. In a few instances, it may be a mixed infection of staphylococcus and streptococcus or of fetides and anaerobes. Bergh calls attention to the value of palpating the lymph glands of the Bartholin glands which lie along side of the uterus on its lowermost part; these he claims can be palpated successfully from the rectum at times by expert gynecologists. It has been usually claimed that the inguinal glands are inflamed in these cases, but Bergh has observed involvement of these glands only thirty-one times in 1984 cases. In the majority of the thirty-one cases there was evident reason for drainage via the skin lymphatics.

Huguier writes of "the orifice of the duct being enlarged or completely lost and is replaced by an opening similar to a culdesac in which the genito-urinary fluids may collect. He also states that the orifice sometimes becomes contracted or completely obliterated thereby causing an abscess, cyst or retention of secretion."







FIGS. 21 to 26.

Cysts, abscesses, sclerous changes, neoplastic growths may exhibit deformation that is easily observed or palpated. Differentiation between involvement of the duct and gland is not easy. It should be remembered that cysts and abscesses originate nearly always in the excretory duct and only exceptionally in the gland itself. A tumor, showing early bulging of the labium and later recession toward the ischial border, may be easily defined as an extension to the gland from the duct. It is, however, to be borne in mind that ruptured abscesses may occur into the rectum or into the perineum. In my service at Providence Hospital last year a sclerotic Bartholin gland was excised some two months after an abscess had been incised, and while proceeding with a perineorrhaphy a fistulous tract containing pus was observed that communicated with the gland duct from a point of 2 cm. below the posterior commissure.

In June of last year a case sixty-two years of age was seen in consultation. In this case was exhibited an enormous swelling of the right vulva extending from the posterior to the anterior commissure. The abscess was superficial and of the duct. The tissues had been dissected by the fluid to a point just internal to and above the posterior commissure.

Another case was referred to me last year by a neurologist. The patient was forty-eight years of age and complained of intense pain and distress from a hickory-nut-sized lump in the right vulva at the situation of Bartholin's gland. The tumor was removed and proved to be a cyst of Bartholin's gland with a thick fibrous cover-

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FIG. 21.—(Magnification 280 diameters). A perivascular nodule taken from the center of a tubercular focus in the Bartholinian gland. In the center of the section are giant cells in the process of formation.

FIG. 22.—A carcinoma occupies the right side of the vaginal entrance. It has a rather wide base and presses the right labium minor forward. The surface presents a cauliflower configuration with tumorous nodules from the size of buck shot to that of a pea, being separated by cracks and fissures more or less deep.

FIG. 23.—A transverse section through a carcinoma of Bartholin's gland. Exteriorly the tumor shows the skin covering, next a dense fibrous capsule then a cystic cavity and at the inside, fatty tissue.

FIG. 24.—(Magnification three and one-half diameters.) A section through a carcinoma of Bartholin's gland. At *a* is shown the orifice of the outgoing canal of the gland.

FIG. 25.—(Magnification seven diameters.) A scirrhus carcinoma of the duct of Bartholin's gland. The duct walls show numerous exfoliations of cancer cells with one single cell layer remaining. The ducts are lined with stratified epithelium with the outer layers consisting of flattened epithelium and the remaining layers of cylindrical and spindle types of epithelium. The epithelium in contact with the superficial cells shows marked metaplasia.

FIG. 26.—A squamous-celled carcinoma of Bartholin's gland. Transformation of the stratified cylindrical epithelium of the preëxisting cavities to squamous epithelium with penetration into the surrounding connective tissue. At *a* is shown an area of extension through the membrana propria.

ing. The patient was entirely relieved of a most distressing train of nervous symptoms. (See Figs. 11, 12 and 13.)

The hematogenous infections of the major vestibular gland may exhibit no ductal changes unless it is from involvement of contiguous tissue which later extends to the duct. Tuberculosis, though rarely an involvement of the gland, may primarily or secondarily show vulvar ulcerations near the ductal orifice. In two cases reported by Lecene of tuberculosis in the gland the minor lip of one case thickened and there was a little hard nodule in the situation of what seemed to be the border of the Bartholin gland. Upon histological examination, however, this was found to be a tubercular infection of the gland.

In the second case there was a painful subacute bilateral adenitis, an involvement of the superior internal group of inguinal glands, and an infiltration of the skin giving it a purplish color. The primary infection had entered by way of an anorectal fistula to Bartholin's gland. Upon the labium majus, at the junction of the middle and lower thirds, there was an ulcer the size of a one franc piece. Microscopically this case showed, as did the first case, tubercular infection which in Lecene's opinion was a primary, hematogenous infection of Bartholin's gland. (See Figs. 19, 20 and 21.)

The gross pathological evidence of neoplastic changes in the major vestibular gland and duct is not easily defined, frequently there is associated cyst formation. In perhaps a majority of instances, however, the neoplastic tumor offers a greater density to palpation due to a considerable thickness of encapsulating fibrous tissue (Fabricius). (See Fig. 23.) The growth is invariably slow and subjective recognition is due to the pain and discomfort arising from discrepant tissue densities which in themselves are significant of an advanced growth. (See Figs. 22, 23, 24, 25, 26, 3, 4, 5.)

Microscopic Pathology.—The pathological changes of the major vestibular glands may be manifested by:

1. Simple hypersecretion, from estrual periods: coitus and erotogenic stimulation.

2. Inflammation.

Forms: Acute: Acute purulent; abscesses. (See Figs. 15, 17, 18.) Chronic: Cysts (see Figs. 8, 9, 10), scleroses. Chronic purulent: abscesses (see Fig. 18), necroses, hematomata (see Fig. 9), infective granulomata, syphilis and tuberculosis. (See Figs. 19, 20, 21.)

3. Neoplasms. Types carcinomata and (see Figs. 20–26: 3–5), sarcomata.

Huguier has clearly called attention to the effects of prolonged

sexual excitation and vulvar vaginal or uterine diseases in producing congestion, and subsequent hypersecretion. Instead of a transitory effect as it should be there is produced a permanent tissue change, characterized by hypertrophy and hyperplasia which may ultimately involve the entire glandular apparatus. Clinically, there is exhibited in certain cases of this type a marked hypersensibility of the gland. Palpation may be either painful or agreeable and in the latter case ejaculation of mucus follows even slight manipulation of the gland. The histopathologic changes of the glandular apparatus following inflammation may be described with the greatest facility and directness under three captions according to their anatomical localizations as canalicular, glandular and periglandular.

The duct epithelium may exhibit hypertrophy, along the entire lumen, or may be entirely gone in many places, leaving the duct surrounded only by connective tissue. Here the areas made bare may show mononuclear and polynuclear infiltration. At the places where the hypertrophic changes are most marked, occlusion may take place, giving rise to cyst formation. The most important change in the epithelium is a transformation of the columnar to stratified pavement epithelium, due undoubtedly in the vast majority of instances to the effects of gonococcal infection. This metaplasia will be most marked at the summits and depths of the crypts. (See Figs. 3, 4, 5, 13, 14.)

The duct orifice may be wholly obliterated or may be seen widely gaping. In early acute inflammations the infiltration about the duct is made up mainly of in wandering leukocytes and plasma cells (Unna). In the lumen of the duct there is pus, free epithelium and gonococci, staphylococci, streptococci, or other bacteria. With this condition the gland easily becomes involved. Where there is occlusion of the duct toward its orifice, and an accompanying infection, there is also the accumulation of duct and gland secretion and early cyst formation resulting. The epithelium is reduced to a single layer of cells which may or may not retain preservation for any length of time. (See Fig. 16.)

In abscess formation there is perhaps always a mixed infection which in the vast majority of cultural tests reveals the presence of the gonococcus. The abscess wall shows polynuclear infiltration extending to varying distances into the contiguous tissues. Rupture of the duct lumen with hemorrhage and extension of the abscess to the vagina, rectum or perineum may occur. The point of occlusion in the duct may open and a fistulous tract is established to the vagina. Extension to the gland of the abscess contents

is easy when one considers the plan of the gland canalization. The conglomerate gland structure facilitates multiple abscess extension or formation. Involvement of the gland acini has been seldom observed. It is to be expected that inflammation of the glandular apparatus in girls under the age of puberty is an involvement of the glandular stem because of the gland's immaturity. The pathology of this condition in children has not been adequately studied. It is indeed a significant field for investigation as Pollock found Bartholin abscesses in 1.6 per cent. of a series of 189 children. In fifty cases of gonorrhea in girls under ten years at Fisher Hospital, Hamilton reports 2 per cent. of bartholinitis: and in fifty cases of gonorrhea of children from two months to fourteen years at Buschke Hospital, Berlin, one case of bartholinitis.

In eighty-two cases of children at Memorial Hospital for Infectious Diseases, Chicago, ranging in ages from thirteen months to thirteen years (75 per cent. being under seven years), there was one abscess of Bartholin. In Hamilton's table of 1972 cases there were three cases. Whether or not one doubts the curability of gonococcus infections, their latency must be admitted. (See Figs. 10–14: 16–18.)

Will the period of sexual function in these cases give opportunity for a gonorrheal "rechute"?

Neoplastic changes in the gland apparatus are not frequently seen. The literature of December, 1913 gives, according to Spencer, a record of but fifteen cases of carcinoma, and I can give no record of primary sarcoma.

Pathological studies of carcinoma of Bartholin's gland (Wittkopp Spencer Schweizer, Fresch, Fabricius, Frank, Schaeffers) give evidence of the cancer cells originating in the squamous epithelium after metaplasias, following old chronic gonorrheal infections. In all cases studied their was no remaining normal gland tissue. (See Figs. 3–5: 22–26.)

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BIBLIOGRAPHY.

1. Duverney. Oenores anat., Paris, 1761, vol. ii, p. 319, et "Mémoire à l'Académie des sciences," 1701, p. 184.

2. Bartholin. Caspar or Bartholin II of Copenhagen, 1677, De

Ovaris. Muleirum et Generationis Historia. Published in Rome, 1677, republished in Amsterdam in 1678, in Nuremberg in 1679 and in Lyons, 1696.

3. Huguier. Mémoire sur les maladies des apparatus sécréteurs des organs genitaux externes de la femme. Cutting from *Mem. Acad. de mêd.*, Par. 1850, xv. 527–847, 5 pl. Des maladies des follicles vulvarires. *Jour. d. conn. mêd. chir.*, Paris, 1852, xx, 141–147.

4. Salmon. De la blennorrhagie du conduit excreteur de la glande vulvovag. *Monit. d. hop.*, Par., 1854, ii, 1130–1132, et *Revue mêd. chir.*, 1854, xvi, p. 361.

5. Marschal. Des absces des glandes vulvo-vaginales. Paris, 1873.

6. Morris. Nocturnal Emissions in Women. *Trans. Med. and Chir. Fac.*, Md., Balt., 1877, 93–96.

7. Duncan. Clinical Lecture on Tumors and Cysts of the Vagina and Pudenda. *Med. Times and Gaz.*, London, 1880, vol. i, 85–87.

8. Hamilton. Gonorrheal Vulvovaginitis in Children. *Journ. Infect. Dis.*, 1908, vol. v, p. 133.

9. Pollak. The Acquired Venereal Infections in Children. *Johns Hopkins Bull.*, 1909, vol. xx, p. 142.

10. Neisser. "Über eine Gonorrhae eigenth micrococcus forme." *Zentralb. f. die. med.*, Wiss., Jullet, 1879.

11. Fauvel. De l'inflammation chronique et des fistules de la glande vulvo-vaginale (Paris). Havre, 1886, 8p., 12 (Repr. from *Med. News*, Phila., 1886); also *Paris med.*, 1886, xi, 301–304; also E. Hustin (Paris). Havre, 1886, p. 50.

12. Bumm. A Review of Gonorrhea in Women. (*Veit's Handbuch der Gynakologie*, Band i, *Am. Journ. Med., Sc.*, 1900, cxix. 73).

13. Labusquiere. *Ann. de Gyn.*, 1890, Tome 33, p. 136.

14. Veillon (A.) and J. Halle. Etude bacterioloquique des vulvo-vaginites chez les petites filles et du conduit vulvo-vaginal a'l'etat sain. *Arch. de Med. exper. et d'anat path.*, Par., 1896, viii, 281–303.

15. Dujon. Etude sur la glande vulvo-vaginale et ses abces., Par. 1897, G. Steinheit, p. 63.

16. Colombini. Recherche batteriologiche e. istologische sulla bartolite contribute all studio dell sna patogenesi. *Geor. ital. d. mal. ven.*, Milano, 1898, xxxiii.

17. Verchere. Traitement des tumeurs de la vulve et du vagin., *Med. mod.*, Paris, 1900, xi, 337–339.

18. Cordier. Traitement des bartholinites chroniques. *Bull. soc. de chir.*, de Lyon, 1897–98, 18–21.

19. Teidmann. Von den Duverneyschen, Bartholinischen, oder Cowperschen Drüsen des Weibes. Heidelberg and Leipsig, 1840.

20. Müller. De genitalium evolutione, Hafae, 1815.

21. Bergh. Beitrag zur Kenntniss der Entzundung der Glandula vestibularis major. *Monatshefte f. prakt. Derm.*, 1895, xxi, p. 377.

22. Wolff. Adenocarcinoma glandulæ Bartholini, *Jour. f. Gebh. u. Fr.* (Russisch), 1890, p. 12.

23. Lang. Bartolinische Drüsen mit doppelten Ausführungsgängen, *Med. Jahrb.*, Wien, 187. N. F. 11, 199–203, 1 pl.

24. Cumston. Bartholinitis, *Internat. Clin.*, Phila., 1896, 6 S., 111, 283–297, 1 pl.

25. Miller. The Glands of Bartholin. *Med. Fortnightly*, St. Louis, 1904 xxv 250.

26. Cullen. Cysts of Bartholins' Glands with Brief Remarks on the Anat. of the Normal Gland Structures. *J. A. M. Assoc.*, Chicago, 1905, xliv, 204–210. Also *Johns Hop. Hosp. Bull.*, xvi, 207–221.

27. Sitzenfrey. Hornkrebs des Gangsystems der Bartholinischen Drüse: zugleich ein Beitrag. zur Genese der Prolapse. *Zeitscher f. Geburtsh. u. Gynäk.*, Stuttg., 1906, lviii, 363–373.

28. Felix. Development of the Urogenital Organs. Human Embryology. Keibel and Mall, vol. ii, p. 752 *et seq.*

29. Spuler. Über die normale Entwicklung des weib lichen Genitalapparates, *Veit's Handbuch der Gynäk.*, vol. v, J. F. Bergman, 1910.

30. Spencer. Case of Primary Cancer of Bartholinis Gland. *Proc. Roy. Soc. Med.*, Lond., 1913–14, vii, Obst. and Gynec. Sect., 177 also 102–112.

31. Wittkopf. Über das Karzinom der Bartholinschen Drüse. *Zentralb. f. Gynäk.*, Leipzig, 1915, xxxix, 369–376.

32. Diday and Doyon. Quoted by Dupuy and Rullier. Des Bartholinites aeguës et chroniques. *Rev. de gynec. et de chir.*, abd., Par., 1908, xii, 387–416.

33. Noebel. Report of Two Cases of Epithelioma of the Vulva. Am. J. Obst., N. Y., 1910, xlii, 204–206, 2 f.

34. Huguier. Memoire. Pages 750 *et seq.*, Acad. de Med., Par., 1850.

35. Langley and Anderson. The External Generative Organs (Innervation). *Jour. Phys.*, Cambridge, 1895–96, xix, 85–121.

36. Miller. Inflammation of Glands of Bartholin. *N. Y. Med. Jour.*, 1905, lxxxi, 735, 799, 845, 892.

37. Schaffer. *Zeitschr. f. Geb. u. Gyn.*, 1903, 1, p. 193. (Prim. caric. Barthol. Gl.)

38. Jambon and Chaboux. Etude Histologique. Des Glandes de Bartholin. *Lyon Medical*, 107, Jm., Dec., 1906.

39. Possi. La Bartholinite. *Ann. de la Polichn. de Par.*, 1912, xxii, 117–120.

40. Lichtenberg. 1906: Beiträge zur Histologie, Mikroskopischen anatomie und Entwicklungsgeschichte des Urogenital Kanals des Mannes und seiner Drüsen. Anat. Hefte., vol. xxxi.

41. Kolliker. Physiologische Studien über die Samenflüssigkeit. *Zeitschr. f. wissenschaftliche Zoologie*, Bd. vii, 1854.

42. Henle. Über die Cowperschen Drüsen. *Göttinger gelehrte Anzeigen*, No. 13, 1863.

43. Plazzoni. De partibus generationi inservientibus. Patavii, 1621.

44. de Graaf. De mulierum organis generationi inservientibus. Leidae, 1672.

45. Haller. Icones uteri humani: in Iconum anat. Fasc, xi, Gottingae, 1745.
46. Heiberg. Om Bestaend af Sliimkjertlerne i Vulva. Christiania, i, 1842.
47. Sänger. Die Tripperansteckung beim weiblichen. Geschlecht, 1889.
48. Morgagani. Adversaria anatomica 1. Bononiae, 1701.
49. Boys de Loury. Observations sur les kystes et les abcès des grandes levres. *Rev. med. franc et etrang.*, Par., 1840, iv, 342–361; also *Ann. de Med. belge Brux.*, 1841, i, 238–243.
50. Biegel. 1878: *Centralb für die med. Wissenschaft.*, Bd. xvi.
51. Bonnet. Des kystes et abcès des glandes vulvo-vaginales. *Gaz. des hôpit.*, Par., 1888, lxi, 637–644.
52. Gosselin. Kyste folliculaire profond du vagin. *Gaz. d. hop.*, Par., 1878, li, 1089–1090 et "abs de la glande vulvo-vag. (Grande levre)" Cliniq. chir. dé l'Hopital de la charite, Paris, 1873, xi, p. 463, 3c. edit., 1876.
53. Foster. Topographical Anat. of Uterus and Its Surroundings. AMER. JOUR. OBST., vol. xiii, 1880.
54. Hunter. Suppuration of the Vulvovaginal Gland. *Tr. N. Y. Obstet. Soc.* (1876–78), 1879, i, 274.
55. Martineau. Sur l'inflammation de la glande vulvo-vaginalæ. *France med.*, Par., 1880, xxvii, 457–459.
56. Scott. Calculi Removed from Cysts of the Vulvovaginal Glands. *Am. Jour. Med. Sc.*, Phila., 1885, N. S., xc, 438–443.
57. Pott. Die specifische Vulvo-vaginitis im Kindesalter und iher Behandlung. *Jahrb. f. Kinderh.*, Leipz., 1882, N. F., xix, 71–78.
58. Touton. Die Gonococcen im Gewebe der Bartholinischen Drüse. *Archiv f. Dermat. u. Syphilis*, v, 25, 1893, pp. 181–186.
59. Schweizer. Carcinoma glandulae Bartholini. *Ibid.*, 322, 331, *Arch. f. Gynaek.*, Berl., 1893, xliv, 263–269.
60. Zeissl. Zur Physiologie und Pathologie der Bartholinischen Vulvo-vaginaldrüse. *Wien. med. Ztg.*, 1865, x, 365–371. (Nos. 45 et 46, pp. 265 et 273.)
61. Taylor. A Hitherto Undescribed Form of New Growth of the Vulva. *Am. Jour. Sc.*, Phila., 1890, N. S., xcix, 125–136, 1 pl.
62. Neumann. Ueber Erkrankungen der Bartholinischen Drüse und tihres Ausführungsganges. *Wiener. med. Blätter*, xi (1888), p. 579.
63. Martin. De L'histologie des Kystes de la glande de Bartholin. *Arch. Clin. de Bordeaux*, 1898, vii, 556–565, 1 pl.
64. Lecene. Tuberculose de la glande de Bartholin. *Ann. de gynec. et d'obst.*, Par., 1909, 2 S., vi, 77–83.
65. Frank. Über Karzinom der Bartholinischen Drüse. *Med. Klin.*, Berl., 1908, iv, 1451–1455.
66. Fabricius. Über ein Primärls. Karzinom der Bartholinischen Drüse. *Monatschr. f. Geb. u. Gynäk.*, Berl., 1914, xl., 69–75.
67. Frisch. *Monatschr. f. Geb. u. Gyn.*, 1904, xix, p. 60. (Prim. carc. Barthol. Gl.)
68. Winslow, Santorini. (Quoted by Rautmann.) Zur Anatomie

und Morphologie der Glandula vestibularis major Bartholin bei den Säugetieren. *Arch. f. Mikr. Anat.*, Bonn., 1904, lxiii, 461–511.

69. Beaton, Chevalerais, Garofalo, Druelle, Langelbert, Menge, Mizot, Weilander. (Quoted by Dupuy and Rullier.) Des Bartholinites aegues et chroniques. *Rev. de gynec. et de chir.*, abd., Par., 1908, xii, 387–416.

70. Astruc, Arnig, Boerhaave, Cruveilhier, Fricke, Guthrie, Barensprung, Hirschen, Hildebrandt, Jadassohn, Leger, Robert, Rhodius, Rolfine, Schwarz, Spigelius, Vidal, Virchow. (Quoted by Bergh.) Beitrag zur. Entzundung der Glandula vestibularis major. *Monats. Hefte f. prakt. Derm.*, xxi, 1895, p. 377.

71. Garengeot. (Quoted by Huguier.) Memoire. Pages 750 *et seq. Acad. de Med.*, Par., 1850.

72. Borst. (Quoted by Wittkopf.) Über das Karzinom der Bartholinschen Drüse. *Zentralb. f. Gynäk.*, Leipz., 1915, xxxix, 369–376.

73. Huschke. Tuberculose de la glande de bartholin. *Ann. de gynec. et d'obst.*, Par., 1909, 2 S., vi, 77–83.

HEAT AS A METHOD OF TREATMENT IN SOME FORMS OF CAVITY CARCINOMA.

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(With one illustration.)

We will first consider the treatment of cancer of the uterus by the application of a Pasteurizing degree of heat applied while the patient is under an anesthetic; and second, refer to the possible beneficial results to be obtained by the continuous application of an endurable or supportable degree of temperature in inoperable cavity carcinoma without a general or local anesthetic.

From the historical viewpoint there are many indications that fire played a most important part in the surgery of primitive man. The records of the past, it is true, are rather shadowy in this as in other important matters of human effort for the relief of diseased processes; but that fire was used to cut down, or remove, offensive external growths, to limit the hemorrhage and do away with the offensive discharge, in addition to cutting off diseased extremities, admits of no contradiction(1).

Following the irregular and empirical use of the cautery, came the epoch-making work of John Byrne, of Brooklyn, N. Y. He advocated the excision of the cancerous cervix by the use of the galvanocautery knife(2). This cutting operation by heat, it is unnecessary to relate, required a high degree of temperature in the electric knife. It can be stated further, and accurately, that the Byrne operation was limited to the first stage of cervical cancer involvement, the type of case that is to-day considered suitable for the Reis-Wertheim radical hysterectomy. Byrne did not attempt his technic in the advanced inoperable pelvic cancer patient; the one in which the examining finger, through the vagina, gets the impression that the pelvic basin is filled with cement. Byrne began his galvanocautery excision of the cervix approximately forty-four years ago. His published results have always interested surgeons, and many of them, in a desultory way, have attempted his technic; but none have had either his experience or his successes to record. But out of these unsystematic or irregular attempts to follow the

work of the Brooklyn surgeon, especially in the last thirty years, occasional reports would be made of the disappearance of advanced cervical cancer where the cautery had merely been employed to melt down the prolific mass in order to stop the hemorrhage and the repulsive waste.

It is also of tremendous interest to learn that for some reason, possibly unfathomable, the cancer-invaded tissues of this type would heal over, and remain so, and the patient recover. A notable outcome in a case of this character is to be found recorded in one of my first papers(3) where I reported the results in my first series of cases, thirteen in number. This patient was operated September 21, 1908, and as far as freedom from pelvic or any other ascertainable form of carcinoma is concerned, is to-day in perfect health(4). This woman's abdomen, however, was not opened, and there was no subsequent treatment.

It was the results in this very extensive and otherwise hopeless type of case that taught me the possibility of a cure from the application of a cauterizing temperature. It may be well to report here also that the great extent of the involvement of the apex of this woman's vagina, with the final favorable results, encouraged me to persist in trying to find a method for the more thorough application of a cauterizing temperature in my future cases, almost regardless of the possible destructive effects on the adjacent normal tissue structures. If the posterior bladder wall, exclusive of the ureteral orifices, or a portion of the anterior wall of the rectum, are involved in the malignant invasion, it is better that these be destroyed with the hope of a future surgical repair, than to leave them uninfluenced by the heat. A colostomy can be made a good substitute for the normal anus, and the upper part of the vagina can be converted into the lower part of the bladder. The tragedy not infrequent in metastatic cancer of the bladder and rectum is an ascending pyelonephritis. This complication exists either alone or combined in a very large percentage of cases when these patients first present themselves. It is not an uncommon finding for the cystoscope to disclose deformed or infected ureteral openings. This condition cannot be improved by the application of the heat. Indeed, if the carcinoma involves the region immediately adjacent to the ureters, and this area is destroyed by the heat, the problem of repair involves the further danger of deforming the ureteral mouths, or of kinking the ureteral tube when the edges of the fistulous opening are sutured together. It was the recognition of this very real difficulty that suggested the technic referred to above, that of converting

the upper part of the vagina into the lower part of the bladder. A vesicovaginal or a rectovaginal fistula, whether produced by the cancer or by the heating iron, adds greatly to the ease with which the ureters, pelvis of the kidney, or the kidney proper, may be infected. In my early work, my greatest concern was a postoperative hemorrhage from the uterine arteries. With the tying of the internal iliacs and both ovarians, this has been eliminated as a source of worry. But a larger experience has developed the fact that a terminal kidney infection, either a nephritis or a pyonephrosis, is a complication that has added to my mortality statistics in a way that cannot be ignored.

I am also convinced that an early prolific cause of these damaged kidneys is a pyometra which so frequently accompanies cervical cancer. The growth blocks the canal, infection of the retained secretions increases, the uterine cavity fills with septic material, and absorption occurs with its varied train of symptoms, viz., cachexia, loss of weight, and general deterioration of health. The patient dies, not from her cancer, but from a general sepsis produced by the mechanical obstruction incident to her malignantly closed cervix. When the heating iron is passed to the fundus of the uterus and the cavity thoroughly sterilized, and natural drainage thus provided for, it is one of the most gratifying experiences in surgery to see these women improve in every way. As a rule, the cachexia disappears within two weeks. If the bladder and rectum have not been opened, the improvement, both local and general, in the great majority of these women, is in every way comparable to the case of benign obstruction of the stomach after a well-made gastroenterostomy.

Occasionally surgeons, in discussing the relative merits of the various recognized surgical procedures for the treatment of cancer of the uterus, refer to degrees of malignancy as they are found in the cervix and body of this organ. The inference is almost always drawn that cancer of the body of the uterus and that of the vaginal portion of the cervix, which does not involve the canal, are much less malignant than the form which has its origin within the cervical canal. From the standpoint of pathology, this is true. In another paper(5) I have referred to the practical classification which may be made when these cases are first examined. On the cervix we may have the "vegetative" or "everting" form of growth in contradistinction to the "infiltrating" or "inverting" form of the disease. This latter is the squamous-cell type of carcinoma of the cervix, which occasionally involves not only the vaginal portion of the

cervix, but the general vaginal walls as well. When this occurs, there is not much ocular evidence of its presence, but, digitally, small pearl-like masses can be felt, which develop not only from the surface structures of the vagina, but also from its deeper tissues. It is this infiltrating form that is exceedingly vicious in its tendency to recur, when once its host is disturbed and laid bare by the knife of the surgeon. It is a curious and also an interesting fact that adenocarcinoma of the body of the uterus seems to be a much less virulent disease than the same disease when at work in the cervical canal. It is also a much more difficult matter to arrest the progress of carcinoma when its greatest activity seems to be at the junction of the body of the uterus with the cervix—the probable explanation, from the anatomical point of view, being the abundance of lymphatics and blood-vessels at the cervical neck in comparison with the meager supply in the body of the uterus. Uterocervical carcinoma, if it originates in the cervical canal, is difficult to arrest, and when disturbed by the knife of the surgeon also often assumes a rapidity of growth that is remarkable.

But it is not necessary to particularize or specify degrees of malignancy in various forms of cancer when subjected to the usual well-known surgical procedures where the knife is used. What should be emphasized is that no matter where the cancer is located —in the uterine fundus, the cervical canal, or the everting type on the surface of the cervix—if given time enough, all forms of the disease will kill the patient. It is begging the question, as one writer has done recently, to state that 75 per cent. of the "fungating" or "everting" type of cervical cancer can be successfully removed by hysterectomy, and without recurrence. You cannot remove any type of pelvic cancer with the cold steel knife, without an enormous margin of risk of a return of the disease. The steel knife always acts as a mechanical stimulant when it touches a malignant cell-nest, no matter how small or how remote it may be from the original focus. To attempt, therefore, a differentiation of the degrees of malignancy, as far as our clinical knowledge of cancer, to-day, is concerned, is useless. Time, alone, is the insistent factor that makes every potentially malignant cell arrive at the same deadly goal.

There is another phase of the pelvic cancer question that I do not believe is sufficiently recognized by surgeons; and that is the slowness with which metastasis appears outside the pelvis in other regions of the body, especially the abdomen. We know that rectal carcinoma in the larger number of cases causes no special discomfort as long as the intestinal tube remains unobstructed, often for years.

The pelvic basin will literally hold carcinoma, many times, until the whole cavity is tightly packed with the disease; and, at postmortem, a thorough search will discover no malignancy other than in the pelvis. These cases unoperated, or, if operated with the knife, die, regardless of the type of cell disclosed. But if the mass can be heated to a degree which experience, and the laboratory, have shown inhibits the further growth of the disease, an otherwise utterly hopeless case can be brought back into the realm of operability with the prospect of a life prolonged in comfort; or, frequently, a life saved for an indefinite period.

In a discussion on cancer metastasis before the American Surgical Association, the late Dr. John B. Murphy(6) referred to the findings in 10,315 postmortems made in cancer cases that had died of the disease, located in various parts of the body, without operation. He stated that in cancer of the cervix and uterus no demonstrable metastasis in the glands outside of the pelvis had been found in 30 per cent. of the cases. In other words, a woman can die, unoperated, of cancer of the cervix or uterus, and a scientific postmortem will disclose no extension of the disease beyond the original focus. Is it at all strange that Murphy should observe, as he did in that discussion: "Then we may well ask: How many cases can be saved by an operation, if it be performed months or even years before the dead-house stage of the disease is reached!"

I believe that we are near the time when we must ask ourselves whether we have not been too pessimistic with regard to the possibility of benefiting cancer by treatment. Our attitude is one of chronic doubt. This is a most unfortunate basis for constructive scientific endeavor in the development of any hopeful form of treatment, whether it be cancer or some other disease. Again, we too frequently give up after the first attempts to obtain benefit seem about to fail. The patient is abandoned to her fate, encouraged to take morphine, which means death due to cancer and morphine. Our pessimism is well reflected by the attitude of the public, who consider the whole question as well settled, and that, too, on the side of utter hopelessness. The treatment of cancer requires an infinite amount of patience in its management, careful judgment and wide experience. In addition the patient, not to mention the surgeon, must be willing to stand a lot of grilling disappointment and grief in an advanced case.

So far, we have been considering the application of heat in cancer, only when the patient is under an anesthetic. General anesthesia, and its effects on the developing body resistance to the progress of

the cancer mass assumes additional importance because of the recent findings of Gaylord(7) of Buffalo. This work seems to show that in the experimental cancer of the laboratory animal there is a distinct lowering of the natural resistance to the growth of cancer after the administration of either ether or chloroform. These studies also seem to demonstrate that the nitrous oxide, oxygen method of anesthesia does not interfere with the animal's resistance to the inroads of cancer to the same extent that ether or chloroform do. The question of the treatment of cancer by heat, without the patient being under an anesthetic, gains additional importance again from the studies of both Wassermann and Delbet. Wassermann determined that a mouse, the subject of experimental cancer, if placed in a continuous external temperature of 40.5° C. (115° F.) will show not only an inhibition of its carcinoma growth, but the cancer will gradually disappear. The control animal, on the other hand, will die from the progressive development of the disease. Delbet repeated these observations of Wassermann's, and confirmed them in every particular.

In my studies of the relative value of high or low degrees of heat in the permanent destruction of a mass of cancer, it did not take long to recognize the fact that a gross mass of cancer could be totally destroyed by the actual cautery; but the important fact remained that the attenuated malignancy outside of the immediate mass was practically not influenced beyond the point of contact with the cautery. The explanation of this is the development of the carbon core from the excessive production of heat in the cautery iron. On the other hand, when a Pasteurizing degree of heat was applied over a period of from forty to sixty minutes, a destruction of the pathological tissue a very considerable distance beyond the direct application of the heat was obtained. The length of time required to obtain the most extensive penetration possible by the low heat in the heating iron is explained by the inhibiting effects of the circulating blood. You cannot get heat penetration in the most effective way until the flow of blood in the parts is arrested. Since the tying the internal iliac arteries and both ovarians the time necessary to get the required degree of heat penetration, has been materially shortened.

My experience in the treatment of cancer comprises, first, the cutting or cauterizing temperature. The logical result of this use of the cautery, in cancer of the uterus, was the production of the carbon core with a consequent inhibition of further heat penetration. This use of the cautery taught me that heat was the essential

thing. From this grew the experimental(8) work from which I determined the necessary degree of heat by a controllable electric heating iron that would give the greater penetration. The direct effect of this degree of heat was determined to be a coagulation of the tissues without the formation of the carbon core. This discovery has been of immense practical value in treating mass-cancer by the dissemination of heat. Both in my clinic, and in the clinics of other surgeons, this later method added greatly not only to the immediate results but in lessening many disagreeable sequela for the patient, so that the remote results, so far, are such as to lead me to believe that we are in a position to offer patients something that is more than a hope.

The one remaining problem has been that of treating the infiltrating form of the disease where it involved the vagina, and possibly the bladder or rectum. In these locations, mass or bulk as it exists in the uterus, is frequently not present; and the cautery is out of the question, because of its destructive effects. Coagulation, on the other hand, cannot be obtained with a low degree of heat, because there is no mass through which it can be disseminated. The next problem, then, was to inquire whether it was possible to adapt to the human sufferer from this disease the methods which had been successfully used to destroy the malignant growths of the laboratory animal by the continuous application of a very low degree of heat. Cancer in the vagina, about the vulva, in the anus, and frequently in the rectum and bladder is, as already mentioned, of the infiltrating type; *i.e.*, it is without bulk, thin, and frequently spreads over a considerable area. It was necessary to devise a special instrument that was practicable for this treatment. I first tried a small electric lamp pushed into the finger of a rubber glove, and inserted it into the vagina. I found that the electric light could not be adapted to this sort of work, because it soon burned out. In addition to this, there was no means of knowing the degree of temperature that one was getting in the cavity treated.

Without detailing further the various attempts made to find a satisfactory instrument, I will describe the one finally adopted as the most useful. It consists of a series current-tap, marked *A* (see Fig.). This can be inserted into any electric lamp socket of 110 volts, on either a direct or alternating current. A carbon lamp *B*, of half ampere with a deep blue glass globe, is part of the outfit. The degree of heat is regulated in the heating iron by a small set screw *C*. The degree of temperature, while the instrument is in use is shown by the thermometer *D*. The heat is maintained auto-

matically in the heating iron *E* at the required temperature, through the series current-tap.

I have stated elsewhere that "A mass of cancer is destroyed when the temperature is raised to 40.5° C (115° F.) and maintained for ten minutes." This requires a degree of temperature, however, in the electric heating iron that is beyond the point of toleration, hence the necessity for an anesthetic. Without an anesthetic the vagina

FIG. 1.—Cautery with thermometer.

gradually establishes a toleration for heat from 49° C. to 60° C. (120° F. to 140° F.). In some cases this toleration reaches 71° C. (160° F.) but only after several weeks of contact with the heat.

My first case of vaginal carcinoma, treated with the continuous application of heat, was Mrs. H., aged fifty-nine, who was referred to me by Dr. J. C. Tritch, of Findley, Ohio. This woman was an utterly hopeless case when she first presented herself for examination, July 24, 1915. Her pelvis and vagina were studded with carcinoma. She was cachectic, suffered pain, had hemorrhages, and was plagued with the usual foul discharge. July 27, 1915, I opened her abdomen, and tied both internal iliac ovarian arteries. The uterus was the size of an ordinary grape-fruit, and its serous

surface covered with malignant nodules. The heating iron was passed to the fundus of the uterus and the heat in the shank of the instrument was allowed to play on the vaginal mucosa with the hope of destroying the infiltrating form of the disease which existed there. This woman made a good operative recovery, and returned to Ohio to visit friends. I did not see her again until December 30, 1915. At this visit she was free from cachexia and looked good. But her vagina was full of carcinoma down to, and involving, the vulva. In addition, she had a vesicovaginal and a rectovaginal fistula. The urine and the feces came through the vulva. She was told that I would open her abdomen again, and, if there were no abdominal metastases, I would treat the vaginal carcinoma.

The abdomen was opened for the second time, December 31, 1915. Absolutely nothing was found indicative of cancer in the pelvis. The uterus was small and free; there was nothing to indicate cancer on its serous surface. The upper abdomen was also without evidence of metastasis. The abdomen free of cancer, I felt warranted in attempting to treat the extensive carcinoma of the vagina by the continuous application of as high a degree of heat as the patient was able to bear without local or general anesthesia. It was necessary to use some force to introduce the heating iron through the vaginal mass. The heat was maintained at a temperature varying from 48.5° C. to 60° C. (120° F. to 140° F.) and used continuously, night and day, except when necessary to empty the vagina of fecal matter, or to allow the patient a little exercise.

The result of the continuous application of the heat in this patient was the gradual disappearance of the mass in the vagina. At the end of six weeks it was possible to insert the largest bivalve duck-bill vaginal speculum. There was no longer any microscopic evidence of cancer. The anterior wall of the vagina was gone; the rectal mucosa protruded through the posterior vaginal wall, as is common in a left inguinal colostomy. Both openings, were perfectly clean and healthy. Digitally, no palpable mass of cancer could be felt. The carcinoma had been completely destroyed by the heat. The patient, however, was not improving physically. It was evident that she was failing. Palpation of the kidneys developed the fact that they were both enlarged and painful. In other words, she was suffering from a double pyonephrosis. She returned to her friends in Ohio and died two weeks later. A postmortem was not obtained.

This case does not record a success; but it records a most impressive fact; and that is, that the continuous application of a low degree of heat converted a vaginal tube, packed with cancer, into one that would admit a large duck-bill vaginal speculum after the heat had been applied, more or less continuously, for six weeks. It should be noted that the ureters, in this patient, were of the golf-ball variety, and that they could be catheterized without difficulty through the vaginal speculum.

My second case was Mrs. M., aged sixty-three, American, house-

wife. Four years ago she was subjected to a panhysterectomy. As far as could be determined from her history, the operation was done for a suspected beginning malignancy. She did well, physically, until a year ago. At that time she developed frequency of urination, with accompanying bladder discomfort. There was an offensive, bloody, vaginal discharge. Examination showed there was no cervix; the vagina vault was thick, immovable, and ulcerating. Through the cystoscope the anterior and posterior walls were pushed together for a third of the distance. She had consulted a number of surgeons. All told her that the condition was inoperable. This patient was put to bed and subjected to the continuous application of heat as described in the previous case. The results were not brilliant, but suggestive. All of the subjective symptoms, of which she complained when she first presented herself, gradually disappeared. At the end of four weeks she believed herself cured. But I did not encourage further treatment because I could not promise further improvement. This was six months ago. This patient reports that she has had no return of the distressing symptoms for which the heat was employed.

This case illustrates well the point already referred to, viz., that the circulation of the blood protects a cancer-mass when it is firm; this was true in this case. Again, the heating iron could not be made to penetrate the center of the mass as in the first case where the cancer-mass was not so firm and more of the "everting" type. The second case belonged to the latter variety.

It is probable that in cavity-carcinoma, vagina, rectum and bladder, where the walls are thin and the carcinoma of the infiltrating type, *i.e.*, well spread out, that the method just described will be found more effective and less destructive to the normal tissue cells than the coagulating degrees of temperature necessary when the abnormal growth is extensive.

In closing, permit me to assure you that I possess no delusions. Neither am I entertaining any illusions regarding the possibility of the work just described. The continuous application of heat is of more than academic interest. My pleasure this evening is in bringing to you the report of one case where, after using a coagulating degree of temperature, the patient remained free from her pelvic carcinoma for one year, dying, finally, from a double surgical kidney. But before she died her extensive vaginal carcinoma also disappeared, under the use of the continuous application of a low degree of heat, in a way to give us hope, at least, that the type of cavity-carcinoma under discussion will become more amenable to the heat treatment when its possibilities are fully developed and understood.

Gentlemen, heat, not fire, will destroy cancer. It merely remains for you and me to work out the great problem of its most efficient application.

REFERENCES.

1. As a Sidelight on this Subject, see "Following the Equator" by Mark Twain, p. 220. American Publishing Co., Hartford, Conn.

2. Dr. John Byrne, President's Address, American Gynecological Society, 1892: AMER. JOUR. OF OBST., October, 1892, vol. xxvi, p. 575.

3. *Journal American Medical Association*, March 9, 1912, vol. lviii, pp. 696–699.

4. A Method of Applying Heat, Both to Inhibit and Destroy Inoperable Carcinoma of the Uterus and Vagina. *Surgery, Gynecology and Obstetrics*, September, 1913, pp. 371–376.

5. A Method of Applying Heat Both to Inhibit and Destroy Inoperable Carcinoma of the Uterus and Vagina. *Surgery, Gynecology and Obstetrics*, September, 1913, vol. xvii, No. 3, pp. 371–376.

6. *Transactions* American Surgical Association, 1915, vol. xxxiii, p. 712.

7. *Journal of Cancer Research.* July, 1916, vol. i, No. 3, p. 379.

8. Best Methods of Discouraging the Activity of Inoperable Cancer: A Study of Heat in Cancer. *Journal of the American Medical Association*, May 23, 1914, vol. lxii, pp. 1631–1634.

THE SURGICAL TREATMENT OF UTERINE CANCER.

BY

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THE value of the various forms of treatment of uterine cancer can only be determined when certain fundamental characteristics of this disease are kept in mind. These characteristics relate to the differences in malignancy observed in the three forms of cancer affecting the uterus; to the distribution of metastasis; and what is of greatest importance, the lessons learned in our clinical experience in the treatment of cancer of this organ.

The three types of cancer found in the uterus are the adenocarcinoma of the fundus, the cylindrical-celled carcinoma of the cervical canal, and the squamous-celled carcinoma of the portio vaginalis. In the later stages of the disease it is often difficult to clinically differentiate these types, yet in most cases this can be done.

The least malignant of uterine cancers is the adenocarcinoma of the fundus. This peculiarity can be explained only on anatomical grounds. The thick uterine wall keeps the growth circumscribed and localized for a long period of time before metastasis can take place. In this position the disease must penetrate the thick, firm uterus before involvement of the cellular and lymphatic tissues of the broad ligaments takes place. Occasionally the metastasis in fundus carcinoma takes place by a downward extension into the cervical portion and then outward into the pelvis.

The most malignant form of uterine cancer is the cylindrical-celled carcinoma of the cervical canal. Here the growth is located in the thinnest part of the organ and immediately contiguous to the cellular spaces at the base of the broad ligaments, rich in blood-vessels and lymphatics. There is also no protective layer of peritoneum. In this manner the early appearance of the disease in the pelvis must be explained.

Another relatively benign form of uterine cancer is the squamous-celled carcinoma of the vaginal portion of the cervix. Here the

growth remains localized for a time, and extension takes place only after the cervix is greatly infiltrated and the cervical canal involved. Owing to this retarded mode of metastasis cases of carcinoma of the vaginal portion are observed which after cautery operations remain free from recurrence for long periods of time, sometimes for years. Such periods of latency are never observed in cancer of the cervical canal.

Another characteristic of uterine cancer is that after extension has taken place into the pelvic cavity, the disease has a tendency to remain localized before other parts of the abdominal cavity are invaded. This tendency to remain localized and the variations in the degree of malignancy has given rise to the belief that the disease can be cured by other means than complete radical extirpation.

In the literature on uterine cancer the results from treatment are usually reported as a whole, no distinction being made as to type. Only occasionally do we find that the fundus carcinomas are given separately, and in a few instances the portio and cervical canal carcinomas are also listed separately. When no such distinction is made and the results from the different methods of treatment are at variance, they always appear more favorable.

From the foregoing, it seems reasonable to infer that cancer of the fundus operated early should be curable by almost any form of hysterectomy. In actual practice this has been shown to be the case. The cures in this form of cancer are estimated as high as 75 per cent. Theoretically, early portio cancers should also be cured by complete hysterectomy, in which is included the upper part of the vagina. To secure good results in the deadly carcinoma of the cervical canal, it should not only be operated very early, but a most complete and radical operation, such as the Wertheim, is imperative. As a general rule, it is more scientific to perform the radical operation in all operable cases.

The most important problem in the whole subject of uterine cancer is that of early diagnosis, for were the disease always recognized in an early stage, there could be no argument regarding a method of surgical treatment. It is a lamentable fact that in actual practice the vast majority of the patients present themselves for treatment when it is too late.

It has been estimated that in this country only about 10 per cent. of all cases are operable. Much can be accomplished in the prophylaxis of this disease in repairing old lacerations and lesions of the cervix. As a prophylactic measure, amputation of the cervix is preferable to trachelorrhaphy. The danger of both cancer of the

vaginal portion and of the cervical canal, the two most malignant forms, is thus permanently removed.

The most important surgical measures to be considered at the present time in the treatment of uterine cancer are:

1. The radical abdominal operation of Wertheim.
2. The extended vaginal operation of Schauta.
3. Percy's operation for inoperable cancer.
4. Radiotherapy with radium or *x*-ray.
5. Surgical operations combined with radiotherapy.

In a paper recently read at Detroit before the Gynecological section of the American Medical Association, 1916, the author attempted a compilation of the results obtained from each of the above methods of treatment.

Where the type of cancer was stated as being of the cervix, the radical abdominal operation of Wertheim employed by ten surgeons, in 566 operations gave a primary mortality of 131, or 23.11 per cent.; and the permanent cures after five years, 144 or 25.44 per cent. The average operability was 35.1 per cent. Wertheim's own figures for his operation are 714 operations with a primary mortality of 119, or 16.6 per cent., and permanent cures after five years of 186, or 42.5 per cent. His operability was 50 per cent. and absolute cures, based upon the number of patients observed, is 20 per cent.

The radical abdominal operation of Wertheim used by eight other surgeons for cancer of the uterus, where the type of cancer was not stated, gave for 498 operations a primary mortality of 101, or 20.3 per cent., and permanent cures after five years, of 87, or 17.47 per cent. Their average operability was 53.6 per cent.

Combining the results of the radical operations obtained by nineteen surgeons, we get out of 1778 operations a primary mortality of 351, or 19.68 per cent., and permanent cures after five years, of 417, or 23.46 per cent. The average operability of all combined is 46.2 per cent. With this operation approximately one out of every four women operated for uterine cancer, pass the five-year limit without recurrence.

The extended vaginal operation of Schauta has its special advantages and gives in the hands of those experienced with it, results which compare favorably with the radical abdominal operation of Wertheim. This operation has not been employed extensively in this country. It is especially advantageous in obese women where the radical abdominal method is always difficult. Thaler, recently reporting the results from the Schauta clinic in Vienna up to the year 1915, gives the following data; 654 operations were performed on

1305 patients; the permanent cures after five years were 133, or 17.4 per cent.; the absolute cures calculated from the number of patients observed was 10 per cent. The average operability as given by Schauta is 58.1 per cent.

Regarding the operation of Percy now so widely employed in the treatment of inoperable forms of cancer, the method is of great value in this class of patients. Percy has given us a new principle in the treatment of cancer. With no other method can the fixed pelvic structures be so loosened and mobilized. The tissues following the application of a low degree of heat are coagulated and dissolved. The method has an operability of 90 per cent., but so far nothing can be said of the primary mortality, the permanent cures, or the absolute cures. The primary mortality is estimated at 50 per cent., the permanent cures after five years cannot be spoken of at this time, as no one has thus far published a sufficiently large series of cases to form any accurate estimate of the actual curability of this procedure. It is highly probable that were the method used in earlier cases of cancer of the uterus, the results would be more favorable. The Percy operation, when properly performed, is the best means at our command for the treatment of inoperable or borderline cases of cancer of the uterus. We await with great expectations the publication by Percy of his end results.

In the *x*-ray and radium we have come to recognize another powerful agency in the treatment of uterine cancer. The recent improvements which have been made along these lines promise to overshadow former results in radiotherapy. It seems that the destruction of cancer cells by röntgen therapy does take place. This has been proved histologically. Case estimates from a review of the literature that in about 25 per cent. of the cases of uterine cancer, the temporary effect of the röntgen treatment has been satisfactory.

From a careful review of this subject, it must be at once apparent that up to the present time our best results are obtained from surgical measures, more particularly the radical abdominal operation. Radiotherapy, heat, and cautery methods are as yet only in their developmental state. The writer has always emphasized the fact that the surgical removal of the diseased organ and the removal of the contiguous tissues, together with the regional lymphatic glands, are principles which are just as necessary in the cure of uterine cancer as cancer in any other part of the body.

It is, therefore, appropriate at this time to emphasize the necessity of giving those patients, who present themselves in an operable

stage, the benefit of surgical treatment, a procedure which conforms to the standard principles for the successful treatment of cancer.

SUMMARY.

The prophylaxis, and especially the early diagnosis, presents the greatest problem in dealing with uterine cancer. The radical abdominal operation thus far has given the highest percentage of cures in operable cases. Until radium, *x*-ray, or Percy's operation shall have proved their superiority to operation, their use should be limited to the inoperable cases. There is abundant clinical evidence at hand to prove the value of radiotherapy; it, therefore, seems logical to follow every palliative or radical operation with radiotherapy.

DISCUSSION ON THE PAPERS OF DRS. PERCY AND JACOBSON.

DR. X. O. WERDER, Pittsburgh, Pa.—I have given the cancer question considerable attention for many years. For nearly twelve years I have used the cautery exclusively in the radical treatment of carcinoma of the cervix; carcinoma of the body of the uterus was treated by an ordinary vaginal hysterectomy or a pan-hysterectomy with such satisfactory results that a more radical operation was not deemed necessary.

The time of the discussion being limited to three minutes, I wish to confine myself to my own results obtained by the radical operation or igniextirpation as we call this operation. It was my privilege to present a paper before the American Congress of Surgeons in New York in November, 1912, in which I made a complete report of all cases treated up to that time by us, thirty-nine of them being operated upon over five years ago, eighteen of them living after five years or 46 per cent. At the present time the number of cases of carcinoma of the cervix treated by me, by the radical operation to date, is seventy-eight, with four deaths, a mortality of 5.1 per cent.;

Of these were operated upon over five years ago..	56
Number of patients living after five years.....	26 or 46.4 per cent.
Number of patients dead during five year period...	29
Number of patients not heard from.....	1
Number of patients treated.....	56

While I fully realize that the number of cases treated radically by the cautery with such good result is not large enough to compare with some of the figures given by Dr. Jacobson, they would, at least, justify a more extensive use of the cautery especially in view of the low mortality the operation gives compared to the other radical methods. Unfortunately the cautery has been associated so long with palliative operations for cancer that the surgeons have

lost sight of the fact that with a proper technic it is not only the safest but, I believe, the most effective agent in the radical treatment of cancer.

DR. E. A. WEISS, Pittsburgh, Pa.—I would like to say that many of the cases which Dr. Werder has reported I have seen personally, and the mortality rate, as well as morbidity, is decidedly less in his operation. It should be called the Werder operation, and certainly deserves a place in surgical literature.

DR. RUFUS B. HALL, Cincinnati, Ohio.—First, I want to commend Dr. Percy on his work. He is doing a wonderful work that has great possibilities. If we are able to control the heat it may have even greater possibilities. Like Dr. Werder, I have treated these cases of cancer for many years, but I am not in a position just now to give statistics, for I did not expect to take part in this discussion. I have risen simply to emphasize the remarks of Dr. Werder that in certain cases which are far advanced, I believe the operation of the electric cautery or of the soldering iron is worthy of a prominent place in connection with these different methods. Patients come to us whom we can offer very little hope, and perhaps only temporary relief, but the use of the cautery does cure some of these cases symptomatically, not for one year but for five years and longer. I believe that if any of these cases can be operated or are operable, they should be operated. If there is a recurrence, we can follow them up and treat them with the local heat. In these cases, where you have a recurrence, by the use of heat it will add greatly to their comfort and save some lives. This is worthy of trial, and if we cannot cure them we can make their existence more comfortable. This we should do. The use of the cautery is certainly along the right line.

DR. WILLIAM SEAMAN BAINBRIDGE, New York City.—I think better results can be obtained in advanced pelvic cancer if, in addition to the cautery, Dr. Percy will employ the preliminary application of the starvation ligature with lymphatic block. For about ten years I have made it a practice to precede the use of the Percy cautery, the Byrne cautery, the Doyen method, radium, or any other procedure that may seem indicated, by my operation of arterial ligation with lymphatic block, and have obtained better results than when this is not done. Even in the Wertheim operation I have found it advantageous to employ this preliminary procedure. It facilitates the control of hemorrhage, checks the malignant growth, in irremovable cases; it diminishes the absorption of poisonous products and facilitates the discharge of pus and necrotic tissue. The application of the additional measures is rendered easier and more satisfactory. The technic, briefly described, is as follows: After a free abdominal incision, one or more of the following arteries are ligated, according to the circumstances of the case: ovarians, internal iliacs, common iliac (in rare cases), uterines, obturator, and sacra media. Either before or after this ligation, the glands along the iliacs are removed *en masse* from the receptaculum chyli to the obturator foramen.

DR. PERCY (closing the discussion on his part).—There is so much to this subject that has been suggested by the discussion and by Dr. Jacobson's paper, that I will not try to enter into all of it. Of course, every one is interested in my mortality statistics, and I misled you in my paper when I said I had only lost two cases, and I am also glad Dr. Jacobson gave you the mortality table of other procedures. I do not know what my mortality is. I do not know how many of these cases I have treated. I have never looked them up, although my records are well kept. I have refrained from doing it simply because I have been interested in the problem of whether heat would cure cancer for a longer time than any other method. I have promised to give my statistics before the Gynecological Section of the American Medical Association next year in New York, and then I can answer some of these questions. I can say frankly I have absolutely refused no case. Why? Because I am deeply impressed with the possibilities of the resistance that I am convinced normally develops in these patients with the growth of the cancer mass. It is true that we do not know much about it yet I have been encouraged by pathologists who tell me that cases who die following the heat technic are found, at postmortem, with their metastatic glands undergoing a process of fibrosis such as described by Handley following a spontaneous cure.

I will tell you briefly some of the cases that are sent to me.

I saw a woman two years ago who was taking thirty grains of morphine a day. She was bed-ridden. She was cachectic. She had nearly a pound of cotton between her thighs and came to the hospital in a Kelly pad because she stunk so that they could not keep her at home any longer. Now, no one with surgical judgment would touch a case like that, yet I did. These are the cases that make up the 90 per cent. of mortality according to Winter's formula. Schauta and Wertheim would not touch cases like that. Winter's formula does not apply to such cases. You cannot talk statistics when your files are filled with cases such as I have just related. In these terminal cases, if you please, the question comes up very properly whether I am not justified in saying that the Percy technic as far as this type of case is concerned is only palliative. I opened that woman's abdomen and what did I find? I found the internal iliac vein on the right side as large as her colon because filled with carcinoma cells. She had a carcinomatous mass in the sigmoid as large as a goose egg. She lived three months. Before she was operated and before she died, you could catheterize the uterus through a bivalve speculum in the vagina. She had a vesicovaginal fistula 2 inches in diameter, rigid and thick, due to carcinoma. What was left of her uterus sloughed out after the application of the heat. When the uterus came away a bivalve speculum introduced into the vagina showed a hole 2½ inches in diameter at the vault and beyond this a hole corresponding to the diameter of the pelvis and lined with granulation tissue. Three days before her death she developed a chill and died within forty-eight hours. Postmortem examination showed two large pyonephrotic kidneys, the sequelæ

which my paper shows so often complicates uterine cancer. You could not put that case under the Winter formula. But here is the interesting and important thing: on postmortem there were no carcinoma cells in that right iliac vein. The mass in the sigmoid, which was as large as a goose egg, at the time of the operation was only the size of my middle finger nail. It had undergone a process of fibrosis and there were no carcinoma cells to be discovered in it.

DR. JACOBSON (closing).—I do not want to be put in the light of decrying Dr. Percy's work in any particular. I would not do that, because I believe in the Percy method in inoperable cases.

It is my thought that a résumé or summary of what has been done in carcinoma would be apropos at this time so as not to mislead our general physicians and surgeons from the main issue, in showing them what has been accomplished by surgery up to the present time.

I want to call special attention to Dr. Werder's statistics. He has told us that he has operated on seventy-eight cases up to the present with only four deaths, and of this number twenty-six, or 46 per cent., have survived the five year period. His results are better than those obtained by Wertheim.

PRACTICAL CONSIDERATION OF SURGERY OF THE STOMACH.

BY

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A STUDY of the clinical histories of 497 operations on the stomach performed by my colleagues, Drs. F. E. Bunts and W. E. Lower, my associates at Lakeside Hospital, and by myself, suggests that the high mortality which accompanies the major gastric operations and the unsatisfactory postoperative results in certain cases, may be due in large measure to two principal factors: (*a*) a lack of complete coöperation between the surgeon and the internist; and (*b*) a tendency to consider the local lesion primarily rather than to *integrate* the patient; that is, to note every phase of the patient's condition that no contributing factor may be neglected.

A. Coöperation between Surgeon and Internist.—All the cases of gastric ulcer in our series had been under the care of internists; yet at operation large, hard ulcers were revealed—a fact that at first tended to shake our faith in the value of medical treatment in these cases. It then seemed as if resection of the ulcer must result in as final a cure as that which follows the excision of a uterine fibroid. But a study of the postoperative histories of our cases soon dispelled this illusion. Immediately after the operation our patients experienced a marked relief, and thus encouraged to believe that a final cure had been secured, they promptly returned to their former occupational and dietary habits, with the result that, in many cases, part or all of the old symptoms returned. It is well known that cases apparently cured by medical treatment also relapse frequently.

These facts suggest that a combination of medical and surgical treatment will yield better results than either alone. Gastroenterostomy alone may in a few days produce results that months of medical treatment fail to accomplish. For example, in three of our cases which had been under prolonged medical treatment, the large ulcer mass completely disappeared in the interval between the first and second stages of a two stage operation. The gastroenterostomy had

caused the ulcer masses to disappear as if by magic, and the proposed resections were no longer required. After the resection of the ulcer the clinical end-results will be much better if a modified Sippey treatment is insisted upon for a prolonged period—not less than a year.

The ideal plan of treatment therefore would seem to be:

First.—A trial of the Sippey or some similar form of treatment.

Second.—If a definite cure is not secured within a reasonable time by this means, one of three procedures should be employed, the choice depending on the individual case—excision of the ulcer, gastroenterostomy followed by excision, or gastroenterostomy alone. The benefit of gastroenterostomy is probably explained by the alkalinization of the gastric juice by the bile; which, as has been shown by Paterson and others, is invariably found in the stomach after gastroenterostomy. Thus the alkaline factor of the Sippey treatment is secured automatically.

In these respects the treatment of gastric ulcer is analogous to the treatment of exophthalmic goiter, in which excision of a lobe of the thyroid only initiates the cure; final recovery being secured only after a year or more of a controlled regimen has been added.

B. The Integration of the Patient.—The principal function of the stomach and the intestines is to control the balance of material for constructive metabolism. It follows logically that any interference with the complete performance of this function will result in a drain upon the body's reserve stores of nutritive or energy-producing material. Since the margin of safety in the individual patient depends directly upon his nutritional reserves, it follows that if these reserves are greatly reduced then any operative procedure, even if technically perfect and performed with minimum trauma, may drain the depleted stores beyond the possibility of restoration. The course of treatment, therefore, and the choice of operative procedure must be governed by the state of the reserves of the individual patient.

THE ADAPTED SURGICAL TREATMENT.

C. It follows that no invariable rule of procedure can be enunciated. For the case that is presented early, before the nutritional balance has been unduly disturbed, an immediate resection of the ulcer or cancer-bearing area may be borne well, and recovery may be prompt. Such cases are rare, however, and these patients are usually emaciated and starved, sometimes exsanguinated, and in the majority of cases acidosis is present or impending. The first stage

of treatment must, therefore, comprise every possible means by which the depleted reserves may be restored. Water in large quantities should be given; sodium bicarbonate and glucose administered; rest in bed insisted upon; and sleep induced, by natural means if possible; if not, by artificial measures. Every energy-draining activity—worry, fear, anxiety, exertion—must be eliminated or minimized.

Transfusion.—In extreme cases the margin of safety may be widened by transfusion. In one of our cases the patient, apparently near death, was brought to the hospital in an ambulance and immediately a transfusion of blood under nitrous oxid anesthesia was given. Her immediate improvement was dramatic and so pronounced that gastroenterostomy was performed; this was followed, some days later, by a partial gastrectomy. The fundamental improvement of the patient began with the gastroenterostomy. She reported herself well six years later. In case perforation has occurred, the hemorrhage may be arrested by propping the patient upright in bed, so that she will be kept constantly on the verge of fainting, the fainting point being utilized as an indication that the blood pr-es sure is sufficiently low to facilitate the coagulation of the blood. As soon as the hemorrhage has ceased the patient is allowed to lie down in order that the circulation through the brain may be restored. This procedure, which in our experience in three instances, has adequately arrested internal hemorrhage is in accordance with the biologic principle that the coagulability of the blood increases rapidly with the lowering of the blood pressure. Low blood pressure produces anemia of the brain, which in turn occasions fainting. It is logical, therefore, to utilize the fainting point clinically as a remedy against internal hemorrhage.

The Graded Operation.—With the starved patient no anesthetic and no narcotic is safe. Anesthetics increase acidity; morphin does not increase acidity, but does interfere with neutralization; physical trauma increases acidity. It follows that the safety of the patient demands that each of these acid-producing factors be reduced to a minimum. Psychic relief may be safely secured by bromides administered by rectum. Just enough nitrous oxid is given to produce a twilight anesthesia; the technic of anociation is employed throughout the operation. In starved cases in which the margin of safety is very narrow, von Eiselsberg's method gives excellent results. A jejunostomy is first performed under local anesthesia, the final operation being delayed until a safe margin has been secured by feeding. Gastroenterostomy alone is more easily borne

than gastrectomy, as the wound is not so extensive as in the latter operation and the physiologic and anatomic readjustment is readily made; and, as we have already stated, the functional readjustment after the gastroenterostomy may be so complete as to obviate the necessity for the second operation. In such cases, a massive chance is taken; not only is there an unnecessary hazard as to life, but a needless operation may be performed.

Special Points in Technic.—No rule regarding the length of the jejunal loop can be made; it must be so adjusted in each individual case as to lie comfortably and easily. If the mesocolon be thick a larger loop may be required than is usual; for the same reason a wider opening must be made in the mesocolon.

The position of the stoma, like the length of the jejunal loop, depends upon the necessities of the case. In general, it is better to make the stoma as near the pylorus as is mechanically possible; it should be done along the middle zone and parallel to the long axis where there are the fewest blood-vessels. Thus the stomach will lie comfortably upon the jejunum. The size of the stoma is of the same vital importance. If the anastomosis is too short, the resultant tension may cause an obstruction. In case this occurs the tension on the anastomosis may be temporarily relieved by placing the patient in a markedly head-down position. To secure permanent relief, another operation of course is required. On the other hand, if the anastomosis is too long, obstruction may result from an invagination of the jejunum into the stomach.

We do not believe in suturing the rent in the mesocolon upon the line of suture between the stomach and the intestine, as kinking is apt to result. For this reason we suture the mesocolon about an inch above the anastomosis. In our experience we have found that a sharp knife dissection gives a more definitive, purposeful control of the mesocolon opening than either a blunt perforation or a tear by traction.

We use chromic catgut for the first line of sutures; these are reinforced by interrupted right-angled silk sutures which include the muscularis. To insure absolute safety against hemorrhage and leakage the shoemaker or cobbler stitch is used for the main suture.

Postoperative Treatment.—During the patient's postoperative stay in the hospital the prime effort should be the restoration of the patient's reserves. To this end, as in the preoperative period, water and nutrition are forced; acid-producing factors are eliminated from the patient's environment as far as possible; and, above all else in importance, sleep is induced by every possible means. While

rest in bed under ideal conditions may prevent further drain upon the patient's reserves, the restoration of the energy-storing and energy-transforming organs is accomplished only during sleep.

As we have already stated, upon leaving the hospital the patient should enter upon a carefully planned and strictly enforced regimen of conduct and diet for a period of at least a year. The surgeon of necessity parts with most of his patients at the hospital door. Whether or not the surgical treatment of his gastric patients will prove finally effective depends in large measure upon the home physician.

SUMMARY.

Since we have appreciated the significance of these factors in gastric cases, and have planned a complete regimen covering the preoperative period, each step in the one or two stage operation, the postoperative period in the hospital, and a year's after-care, the mortality rate in 144 operations has been reduced to less than one-third the former mortality of gastric operations. The postoperative morbidity, too, has greatly decreased.

DISCUSSION.

DR. JULIUS H. JACOBSON, Toledo, Ohio.—I rise to make a statement regarding the moving picture in teaching surgery. Most of you will remember that in 1913, at the Providence meeting of this Association, I illustrated local anesthesia in hernia operations with a thousand feet of film. At that time, so far as I was able to determine, it was the first moving picture demonstration for teaching surgery in this country. I left my paper in charge of Mr. Whitford, our official stenographer, with the request that he write something about the demonstration for publication in the transactions. This was in some way overlooked, and it did not become a part of our transactions. I wish to make this statement because of the prominence which the moving picture is now being given in the teaching of surgery.

Dr. Crile has given us an entirely new idea in the animated drawings, and from what I have seen I should say that they are of considerable advantage. With the moving picture anything that can be brought to the surface can be easily shown. The animated drawings will find the greatest use in showing deep structures which cannot be shown by pictures. In taking moving pictures it is entirely a matter of light in the operating room, and the person who manipulates the camera should understand the steps of the operation. It seems to me that a film composed of a combination of animated drawings and moving pictures would be ideal. I believe the moving picture and the animated drawings in surgical technic have come to stay.

APPLYING THE ANIMATED DRAWING TO THE TEACHING OF SURGICAL TECHNIC.

BY

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(With one illustration.)

In our clinic during the past three years we have tried to illustrate surgical technic by every possible method. To this end we have made pen and ink, color, and half-tone drawings; we have employed stereoscopic, plain, and color photographs; we have tried clay modelling. Nevertheless, there have been some problems which it has been impossible to illustrate clearly by any of these methods. A few months ago, however, we found that these difficulties might be solved by the use of animated drawings.

Our surgical books and magazines, as well as practically all textbooks in surgery and anatomy, are illustrated with drawings and diagrams, the photograph seldom being used for these purposes. If the drawing is better than the photograph for books and magazines, it naturally follows that the animated drawing is superior to the animated photograph, especially when utilized for the teaching of surgical technic.

I wish to illustrate, by means of a film, how the animated drawing can be used for teaching purposes. The first part of the reel shows a motion photograph of the cobbler stitch. The operative field has been cleared of every obstruction in the way of unnecessary instruments and gauze, so that only the hands of the operator appear while the stitch is being made. This gives the clearest demonstration that is possible with motion photographs (a). Part two of the film is a repetition of the same stitch, but the animated drawing is used for the demonstration. No hands, no instruments, and no other obstructions interrupt a close observation of the maneuvers of the needles. A clear and accurate demonstration of this most difficult stitch is the result (b).

That the same principle applies to the demonstration of instruments is proved by a motion photograph of gloved hands showing the use of the trocar and cannula for suprapubic puncture, followed by an animated drawing of the same instrument in use (c). The high lights and shadows of these instruments cannot be controlled in photograph, but in the drawing the important points are emphasized, while the unimportant are subdued or entirely eliminated. The remainder of the film is devoted to the possibilities of the animated

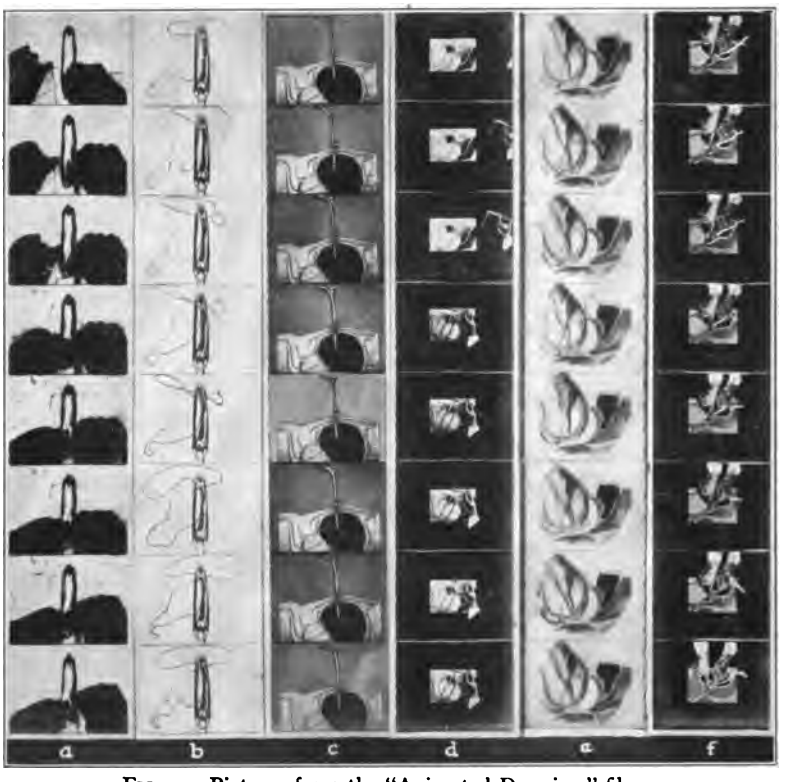

FIG. 1.—Pictures from the "Animated Drawing" film.

Each of the above strips represents a half second of pictures when projected on the screen. (a) The clearest demonstration possible with motion-photographs of the cobbler-stitch. (b) The same stitch in animated drawing. (c) Demonstrating an instrument. (d) Infiltration in deep dissection. (e) The removal of the prostate gland. (f) Packing over the cavity with gauze.

drawing for teaching purposes, as emphasized in demonstrations of surgical technic for deep dissection.

Schematic drawings and diagrams can be utilized to show the exact technic of any procedure. The film which shows the infiltration of the skin and the subcutaneous tissues demonstrates clearly the

superiority of the animated drawing in depicting superficial technic. For deep dissection, however, the animated drawing is indispensable. Since a photograph is impossible, the animated drawing is the only means of illustrating surgical technic in the deep and hidden portions of the body. To demonstrate this point, the film shows a technic for performing a shockless suprapubic prostatectomy. By means of cross-section drawings of the pelvis, the infiltration of the capsule is first shown (d), then the enucleation of the prostate, and finally the removal of the gland (e), and the packing of the cavity with gauze. None of these procedures can be seen in the actual operation or followed by the camera. In the animated drawing they are clearly demonstrated.

One obvious advantage of the animated drawing is that it can always be kept up-to-date, since changes can be made at any time. Obsolete or undesirable parts can be eliminated and new ones inserted or added. Another advantage is that the artist never needs to wait for a particular time, or patient, or surgeon. If the technic has once been worked out, he can make his drawings at any time, without delay or inconvenience to anyone.

Think of the possibilities of the animated drawing for the teaching of embryology and obstetrics offers another field for the use of the animated drawing. The development of the embryo, from conception until birth, could be shown in a few reels. Then, from the original film any number of other films could be inexpensively made and distributed to the hospitals and colleges all over the country for teaching nurses and medical students this most complicated and important part of their training.

It will thus be seen that the animated drawing is not confined alone to illustrating points in surgical technic, but can be as readily applied to any other department of medical teaching.

THE MECHANICS OF THE STOMACH AFTER GASTRO-ENTEROSTOMY.

BY

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THE modern method of fluoroscopic examination of the gastro-intestinal apparatus has given the abdominal surgeon a new means of following up and determining the anatomical and physiological changes which result from operations on the stomach and intestines.

Such post-operative *x*-ray studies will teach the surgeon much regarding the mechanism of the stomach and also serve as a guide in future operations of a similar nature. Even though the surgeon has endeavored to place his anastomotic opening always in the same position in the stomach, he will be surprised at the differences in the site of the stoma, the variations in stomach tonicity, peristalsis, and especially of the emptying power of the stomach. That this follow-up method has not been generally practised is evidenced by the few reports of such examinations in our literature as compared with the vast number of stomach operations which have been performed.

What becomes of the new opening in the stomach after gastro-enterostomy? Does it functionate in the presence of a patulous pylorus? Is gastroenterostomy a drainage operation? Is it always necessary to occlude the pylorus when gastroenterostomy is performed? Do such artificial occlusions remain permanently closed? All these are questions upon which there has been until recently little unity of opinion. The following is a résumé of the literature together with a report of personal observations in seventeen patients on whom a gastroenterostomy operation had been performed.

Cannon and Blake(1) based their observations upon experiments on lower animals. The impression has been gained from Cannon's work that the new anastomotic opening in the presence of a patent pylorus will close in time. This impression was probably based upon Cannon's observations in his experiments on cats, that when

the opening was not in the antrum pylori, food and even fluids were pushed through the pylorus rather than through the new opening. This occurs when both ways are opened. They also observed the circulation of food through the pylorus to the duodenum and back through the anastomosis into the stomach not followed by a vicious circle. Cannon determined that the pylorus is the lowest part when the stomach is empty; that the intragastric pressure is three to four times greater at the pylorus than at the cardiac end; and that an artificial stoma should be large and as near the pylorus as possible.

Pers(2) 1909, reported his postoperative radiographic study of forty patients. In thirty-eight cases evacuation of the stomach was observed occurring through the anastomosis and much more quickly than the normal pylorus evacuation. In one case it seemed that the pylorus was used somewhat and in the other cases both openings appeared to functionate. . The pictures, Pers observed, varied much according to the case. Evacuation of stomach contents sometimes commenced about one-quarter of an hour after the meal; in some cases while the patient was still eating. Pers divided his observations into three groups; in the first the stomach does not commence to evacuate until very late, and empties in about one and one-half hours; in the second group the stomach empties immediately after food enters, and is entirely evacuated in from twenty to fifty minutes; in the third group the bismuth meal escapes as soon as it enters the stomach, and is evacuated in from ten to twenty-five minutes. The normal emptying time is from four to five hours. These results show that the stomach, including the pylorus, is filled in the first two groups, but not in the third group. Pers concludes that the gastroenterostomy anastomosis always functionates regardless of permeability of the pylorus, and that the stomach empties so rapidly that a gastroenterostomy may be considered a drainage operation.

Ribas(3), 1910 to 1911, reports observations similar to those of Pers, that there are three types of gastroenterostomy stomachs: *A*. Those which contract energetically and pass the contents rapidly to the intestines. *B*. Those in which contractions are delayed from twenty minutes to one hour. *C*. Those in which contraction is delayed from one-half to three hours after the bismuth meal enters the stomach.

After the operation of gastroenterostomy the radioscopic screen affords a means of examination of equal value to that of the stomach tube. It is, moreover, quite painless, and much more agreeable to the patient than the introduction of a stomach tube.

Radioscopy not only indicates the movements of the stomach, but also their energy and quality. The screen examination not only enables us to form an adequate prognosis in cases of gastroenterostomy, but assists us in formulating the dietetic and therapeutic treatment.

The ejection of the bismuth meal, as seen by the radioscopic screen, takes place sooner than the evacuation of a test meal introduced by the stomach tube, but this does not invalidate the method since the earlier evacuation is due to the bismuth which acts as a foreign body and stimulates the muscular contractions. Apart from the time, there is a definite relation between the findings on the fluoroscopic screen and the clinical observations.

The active contracting portion of the stomach is the horizontal limb, and of this portion the last to lose its contractile power is the antrum pylori. This fact shows the necessity of opening the antrum pylori in the operation of gastroenterostomy.

Ribas thinks that in those cases of gastroenterostomy in which some permeability of the pylorus persists, the new anastomotic aperture closes after a time, and the original pyloric opening resumes its function.

Schuler(4) in 1911 published his studies based upon accurate observations of patients upon whom gastroenterostony had been performed. Some of his cases were pylorectomies for cancer, and in some others the anterior gastroenterostomy had been made; therefore, his observations are not without defect. Screen examinations showed that a gastric enterostomy placed at the declivity part of the stomach fundus, does not in any way modify the form, the mode of repletion, the situation, nor the mobility of the organ. Evacuation in all Schuler's patients was made at least in part by the pylorus. In the normal stomach of dogs Schuler states that a gastroenterostomy made at the level of the antrum pylori or at the declivity point of the stomach fundus, does not sensibly modify the physiological evacuation by the pylorus; the greater part of the food continues to pass by that orifice.

If there is evacuation through the artificial opening it is not continuous; generally it is synchronous with the pyloric evacuation when that opening is on the antrum. It is irregular and independent of the pyloric contraction when the opening is on the stomach fundus. A gastroenterostomy made on the fundus obliterates quicker than if made on the antrum. This is also the case in man.

The studies of Hartel (5), 1911, are worthy of special note. This

author's report is based upon the very elaborate study of twenty-two cases of gastroenterostomy, mostly about one year to one and one-half years after operation. In the majority of cases the operation was a posterior mesocolic one. Radiography showed that the gastroenterostomy stomach fills like a normal one; only the pyloric region more slowly and more incompletely than in the physiological state. Emptying of the stomach commences at the beginning of ingestion, but is only progressively completed. Evacuation is not more rapid than in a normal stomach. Either the pylorus or the anastomosis may be utilized for evacuation; but no matter what the condition of the pylorus, the anastomotic opening always gives passage to some other contents. The part, however, played by both openings varies according to conditions.

Gastroenterostomy does not noticeably modify the progress of peristalsis. The stomach contractions persist and push the food toward the pyloric opening even if it is impermeable. Special conditions which modify the emptying are an organic stenosis of the duodenum, pylorus, or any part of the stomach; evacuation is then exclusively by the anastomosis. If there is a pyloric lesion without stenosis, evacuation is both by pylorus and anastomosis. Hartel thinks that persistence of pyloric permeability does not cause a progressive retraction of the anastomotic orifice. In two of his cases with complete pyloric permeability, the gastroenterostomy remained patent, two and seven years after operation. Closure of the anastomotic opening is due to a pathological condition (ulcer developing at the site, etc.) and not to a defect in the function of the new stoma.

Caillé Durand and Marre(6) have reviewed forty-five cases of gastroenterostomy. From their clinical and radiographic studies they have shown the great frequency of simultaneous function in both pylorus and anastomosis. This may be observed shortly after, or some years after operation, and it happens among those who no longer have symptoms as well as among those who have.

Hess(7), 1912, examined thirty-one gastroenterostomized patients with the radioscopic screen. He concludes that the results given by a number of previous observers based on a small number of cases ought not be generalized. Of the thirty-one gastroenterostomies, twenty-seven were retrocolic operations.

Hess finds: (1) That a good functionating anastomosis does not exclude a persistence or return of gastric troubles. (2) That in old cases in which the anastomosis functionates well, the pylorus appears closed. (3) That, reciprocally, when the pylorus continues to functionate, the anastomosis is generally no longer permeable.

(4) That in the majority of cases the duration of gastric evacuation is accelerated, sometimes considerably so, up to the time when the level of the gastric contents leaves the mouth of the anastomosis uncovered, when, it is then reduced in rate. (5) That gastric atony may be ameliorated following operation, but not always; moreover, that atony does not necessarily influence evacuation, for this can be perfectly accomplished in stomachs apparently quite atonic.

Hess states that new radiological observations should be made to determine definitely whether the pylorus ought to be closed to attain prolonged functioning of the anastomosis.

Zweig(8), 1913, advanced the idea that the spasmodic closure of the gastroenterostomy opening is responsible for many bad results. in many of his patients who were nervous there was sufficient permeability of the pylorus as shown by the radiograph, yet vomiting persisted. Excitation of the vagus brought about hypertony of the stomach musculature and caused closure of the orifice.

Matthew and Savignac(9), 1913, say that intermittent or continuous diarrhea and abdominal pain after eating are phenomena due to atony and great dilatation of the stomach.

Radioscopic examinations show that gastrocolic fistula, partial stenosis of the small intestine, and jejunal ulcer are produced in patients in whom the emptying of the stomach through the gastrojejunal anastomosis takes place with rapidity. The pathological causes may be the lack of gastric secretion, and the arrival of the food in the intestines without admixture of normal gastric secretions. Distention, irritation (both chemical and physical) in the intestines, and neuropathies are observed in such patients.

Hertz(10), 1913, reported that in patients after gastroenterostomy where the stomach empties too rapidly, the stomach was too small and hypertonic. Little or nothing passes through the pylorus if open. The stomach empties much less rapidly when the patient assumes the recumbent position after a meal. He observed that in cases of extreme dilatation when the patient is in the vertical position the whole of the gastric contents accumulates in the lowest part of the stomach in such a way that the upper limit of the food is below the pylorus. In such cases nothing can leave the pylorus until the patient lies down, and an effective gastroenterostomy must have the stoma so situated that it remains in the most dependent part of the stomach even when the vertical position is assumed.

Mallory(11), 1914, pointed out the influence of the vagus nerve on the results following gastroenterostomy. He stated that if the stoma is made of the usual size and in the correct location, it will

functionate properly. If the neuromuscular mechanism is hypertonic and hypersensitive, it is not removed by operation, and spastic contraction continues after it. Röntgen examinations, unless made just at the time of a spasm, will show the stoma open. The surgical remedy is to recognize vagotomy before operation. He draws attention to the effects of disturbances of innervation, on the secretory motor, and sensory functions of the stomach both before and after operation.

Mayo, C. H.(12), 1914, stated that if a gastroenterostomy opening is made far into the greater curvature, the less effectual is the drainage. A gastroenterostomy thus located requires efforts at pyloric closure to improve delivery. But if the opening is made toward the pylorus the peristaltic contractions will start the contents toward the intestine through the new opening. Such a gastroenterostomy will deliver the gastric contents even if the pylorus is open.

The most complete résumé of this subject is given by Hartman(13), 1914. He combats the idea that when the pylorus is permeable the gastric jejunal orifice does not functionate and tends to obliterate.

If such orifices close it is only because a cicatricial tissue is developed at their level, as a result of defects in the primary union, or because there was a secondary development of an ulcer with subsequent cicatrization at the level of the anastomosis.

In answer to the inquiry whether gastrointestinal orifices are physiologically useless in the presence of pyloric permeability; Hartman thinks this depends entirely on the position of the orifice. Experimentally he found: (1) When the orifice is near the pylorus, the greater part of the gastric contents passes through the new opening, and little if any, through the pylorus. (2) When the orifice is placed far from the pylorus on the cardiac part of the stomach, almost all the contents pass through the pylorus. These facts agree with the observations on the human subject. In almost all of his gastroenterostomized patients who have a large opening on the pyloric antrum he has observed that almost the entire contents will pass through the anastomosis.

In order that the gastric contents pass from the stomach to the intestines, it is necessary that the pressure to which it is submitted must be stronger than the tension of the intestinal contents. Experiments show that while very weak in the cardiac part, the pressure is increased in the pyloric part and this is raised considerably at the moment of gastric contraction.

It is easy to understand from physiological considerations that juxta-pyloric orifices will functionate even when the pylorus is nor-

mal, and that orifices on the cardiac part will remain useless from the evacuation point of view.

Case(14), 1915, also stated that the stoma should be fairly large and near the pylorus; that conditions which stretch the stomach should be avoided; and that several centimeters of distal intestine should be attached to the stomach to prevent kinking in the jejunum. Cannon and Blake thought that pyloroplasty, when possible, was the operation of choice, that rapid exit of food from the stomach was prevented by rhythmical contracting rings formed in the duodenum. Case has found this to be true, in several patients in which either a Finney operation or an ordinary gastrojejunostomy has been done, *i.e.*, a sort of sphincter action about 3 to 6 centimeters below the gastrojejunostomy opening. This contracting ring just below the opening simulates the normal action of the pyloric sphincter.

Case has also observed stagnation of food in the jejunum at or near the site of gastroenterostomy, especially toward the end of the gastric clearance—apparently in the small bowel at the site of the anastomosis. This stasis may be accounted for by the inhibition of onward peristaltic activity.

In order to determine the mechanical function of the stomach following gastric operations, Doctor Murphy has made fluoroscopic observations on seventeen of our patients.

The gastroenterostomy in this series of cases was always a posterior vertical no-loop operation, and was performed six times for duodenal ulcer, seven times for gastric ulcer, and three times for adhesions about the pylorus, and in one instance a pylorectomy with gastroenterostomy was performed for benign pyloric stenosis. A detailed account of each operation with radiographic findings is given in Table.

The observations range from two months to four years from time of operation. Although this period may not be of sufficient duration to make positive conclusions regarding the ultimate patency or closure of the new stoma, yet in no instance did we observe a closure of the opening. In every instance the patient stated that he was either entirely relieved of his original symptoms or was very greatly improved. All could be classified as symptomatically cured.

A series of fluoroscopic observations on patients operated five or more years would be of considerable importance in making final conclusions.

The technic employed in making these observations was as follows: The patient was placed before the fluoroscopic screen in

an upright posture and given 2 ounces of water and 1 ounce of barium sulphate, after which 4 ounces of barium and 16 ounces of buttermilk were given. The normal emptying time for such a barium meal is about four hours.

In sixteen of our simple gastroenterostomy cases the pylorus was occluded three times; for this closure the round ligament of the liver was used once, and in the two other instances a suture with linen was used. In the single case where the round ligament was used, the pylorus was not patent eleven months after the operation, and in the other two cases, one was not patent after fourteen months, and the other after five months. In five cases the ulcer of the duodenum was inverted by linen suture and with one exception, the pylorus was patent in all. These cases invariably showed some retardation of the food through the pylorus. In two instances food passed out of the stomach so rapidly that no food reached the patent pylorus. In every instance where both the pylorus and stoma showed the passage of food, most of the food passed through the stoma.

The situation of the opening and its size has much to do with the emptying time of the stomach following gastroenterostomy. As a rule, it may be stated that the nearer the pylorus and the larger the opening, the more rapidly does the stomach empty.

In every case the stomach emptied itself more quickly than is the case in a normal stomach. It is for this all-important reason that the impressions gained were that a gastroenterostomy is a drainage operation. In eleven of our cases the fluoroscopic observations regarding the motility were made previous to operation, and in every instance the operation showed shorter emptying time.

It has been claimed by some writers, notably Patterson, that the good effects of gastroenterostomy are due to chemical changes in the gastric secretions, that there is lessened hyperacidity, due to the presence of bile and pancreatic juices in the stomach.

It is probable that both the drainage factor and the chemical changes are responsible for the cures of gastric and duodenal ulcers after gastroenterostomy.

CONCLUSIONS.

1. That all patients examined in this series were uniformly well.
2. That gastroenterostomy openings properly made and placed do not obliterate.
3. That the gastroenterostomy openings functionate equally as well as in the presence of either an open or closed pylorus.

TABLE.—FLUOROSCOPIC OBSERVATIONS FOLLOWING GASTROENTEROSTOMY.

No.	Sex	Age	Time since operation.	Type of operation and pathology	Pylorus at time of operation	Motility	Emptying time of barium meal	Pyloric patency	Gastroenterostomy opening	Stasis in loops	Type of stomach
1	Male.	55	9 mo's.	Post gastroenterostomy. Adhesions about pylorus; cholecystitis; chr. appendicitis.	Pylorus not sutured.	No peristalsis.	Very rapidly at first. When stomach was filled, more slowly. All out in 4 hours.	Patent. Cap was filled. Food could be forced through at any time.	Patent. The opening does not seem to be very near pylorus.	None.	Orthotonic.
2	Male.	42	5 mo's.	Post gastroenterostomy. Gastric ulcer on lesser curvature.	Occlusion of pylorus by suture of linen.	No peristalsis.	Stomach nearly empty in 1½ hours. Entirely empty in 3½ hours.	Pylorus did not fill nor could any be forced through at 1½ hours.	Patent, opening close to pylorus. Food ran out at once.	The loop close to stomach was filled in 1½ hours. Some peristalsis seen in duodenum. Loop was filled but not distended. Food could be forced back through opening.	Hypertonic.
3	Male.	38	8 mo's.	Post gastroenterostomy and pylorectomy at 2d operation. Obstruction of pylorus, probably carcinoma.	Pylorectomy.	Normal peristalsis.	None passed out for 5 minutes; then it began emptying rapidly. Very small residue in 4 hours.	Pyloric end did not fill.	Patent. The opening is near the end of the stomach.	None.	Slightly hypotonic.
4	Male.	46	1 yr. 9 mo's.	Post gastroenterostomy. Ulcer on posterior surface of duodenum.	Pylorus narrowed by suture of linen.	No peristalsis.	Began to go through at once. Almost empty in 1½ hours.	Patent duodenal cap filled.	Patent. Opening near pylorus.	First loop became very full. Slight accumulation at opening at end of 2 hours.	Orthotonic.
5	Female.	35	1 yr. 5 mo's.	Post gastroenterostomy. Adhesions about pylorus and duodenum.	Pylorus not sutured.	No peristalsis.	Almost empty at end of 30 minutes.	Pylorus filled but none could be forced through. None passed through in right lateral prone position.	Patent. Opening not so near pylorus. Food ran to right.	None.	Orthotonic.
6	Male.	55	11 mo's.	Post gastroenterostomy. Gastric ulcer on lesser curvature.	Pylorus occluded with round ligament of liver.	No peristalsis.	Did not go through at once. Opening very near pylorus. Small residue in 4 hours.	Not patent.	Patent. Food did not leave so very fast.	None.	Hypotonic.

7	Male.	23	2 mo's.	Post gastroenterostomy. Duodenal ulcer.	Inversion of duodenum over ulcer.	Deep peristalsis.	Did not go through at once. All out but a very small amount in 2 hours.	Duodenal cap filled but none went beyond. Pylorus patent.	Patent. Only small amount went through in 20 minutes.	. one.	Hypertonic.
8	Female.	50	3 mo's.	Post gastroenterostomy. Duodenal ulcer.	Inversion of duodenum over ulcer.	No peristalsis.	Did not empty fast at first. Empty in 1½ hours.	Patent.	Patent. Opening seems to be near pylorus.	None.	Hypotonic.
9	Female.	45	11 mo's.	Post gastroenterostomy. Ulcer on lesser curvature about to perforate.	Pylorus not sutured.	No peristalsis.	Ran out as fast as it entered. All out in 5 minutes.	Patent.	Patent, near pylorus.	None.	Hypertonic. Spastic in drawing on greater curvature.
10	Male.	36	2 yrs. 8 mo's.	Post gastroenterostomy. Perforated gastric. Ulcer on lesser curvature near pylorus.	Inversion of pylorus about ulcer.	Normal peristalsis.	All out in 1½ hours.	Not patent.	Patent.	None.	Orthotonic.
11	Female.	46	4 yrs.	Post gastroenterostomy. Ulcer on lesser curvature.	Pylorus not occluded.	No peristalsis.	All out in 5 minutes.	Never filled. Stomach emptied too rapidly.	Patent.	Stasis in loop near terminal ileum due to adhesions.	Hypertonic.
12	Male.	28	14 mo's.	Post gastroenterostomy. Severe hemorrhage from gastric ulcer.	Pylorus occluded by suture.	No peristalsis.	All out in 30 minutes.	Not patent.	Patent.	None.	Orthotonic.
13	Female.	30	2 mo's.	Post gastroenterostomy. Duodenal ulcer.	Inversion of ulcer by suture.		Very rapidly.	Not observed.	Patent.	None.	Not stated.
14	Male.	35	2 mo's.	Post gastroenterostomy. Duodenal ulcer.	Pylorus not closed.		Very rapidly.	Not observed.	Patent.	None.	Orthotonic.
15	Male.	36	2 yrs. 5 mo's.	Post gastroenterostomy. Ulcer on lesser curvature.	Pylorus not closed.	No peristalsis.	Rapidly. Small residue in 4 hours.	Pylorus did not fill.	Patent.	None.	Orthotonic.
16	Male.	35		Post gastroenterostomy. Adhesions about pylorus and gall-bladder.	Pylorus not closed.	No peristalsis.	All out in 1 hour.	Not patent.	Patent.	None.	Hypotonic.
17	Female.	55		Post gastroenterostomy. Duodenal ulcer.	Inversion of ulcer.	Some peristalsis.	Small residue in 3½ hours.	Patent. Duodenal cap filled.	Patent. Small.	None.	Orthotonic.

4. That it is not necessary to artificially occlude the pylorus in gastroenterostomy.

5. That the gastroenterostomy opening to secure the maximum amount of drainage must be of ample size and placed as near the pylorus as possible, preferably in the antrum pylori. Such openings must not be made on the fundus of the stomach nor on the lesser curvature.

6. That gastroenterostomy is essentially a drainage operation.

7. That serious distention in the jejunum does not occur after gastroenterostomy, the food is seen to pass rapidly through the many loops of the small intestine before it finally stops. Even in those patients who are entirely relieved of their former symptoms food can be forced backward into the stomach from the jejunum, and although this can be done easily, such regurgitations do not seem to make any difference.

BIBLIOGRAPHY.

1. Cannon and Blake. Annals of Surgery, 1905, pp. 686–711. W. B. Cannon. The Mechanical Factors of Digestion, 1911, Longamen Green Co., N. Y.

2. Pers, A. Method of Action of Gastroenterostomy. *Nordisches Med. Archiv* (Stockholm), Dec., 1909, xlii, Part 1, *Chirurgie*, 1–15.

3. Ribas, T., Ribas, E. (Barcelona); The Motility of the Stomach after Gastroenterostomy. *Archives of the Röntgen Ray*, 1910–1911, xv, 283.

4. Schuller L. Clinical and Experimental Researches on the Functioning of the Stomach after Gastroenterostomy and Pylorectomy. *Mitteil. a. d. Grenzgeb. d. Med. u. Chir.*, 1911, xxii, 715–770.

5. Hartel. Gastroenterostomy and Radiography. *Deutsche Zeitsch. f. Chir.*, 1911, cix, 317, 395.

6. Caillé, Durand and Marré. Immediate and Ultimate Results in Forty-five Cases of Gastric or Duodenal Ulcer. *Arch. des mal. de l'appareil digestiv*, 1912, vl, 361–402.

7. Hesse. Radiologic Study of Gastroenterostomy. *Zeitsch. für Röntgenkunde*, 1912, xiv, 153–178 and 195–227.

8. Zweig. The Bad Results of Gastroenterostomy for Stenosis due to Spasmodic Closure of the Gastric Opening. *Archiv f. Verdauungskrankh.*, 1913, xix, 740.

9. Mathieu A. and Savignac, R. Study on Intestinal Disturbances Consecutive to Gastroenterostomy. *Arch. d. mal. de l'appareil digestiv*, 1913, vll, p. 541–581.

10. Hertz, A. F. The Cause and Treatment of Certain Unfavorable After-effects of Gastroenterostomy. *Ann. of Surg.*, 1913, lviii, 466.

11. Mallory, W. J. Gastric Hypertony and Gastroenterostomy. *Jour. Am. Med. Assn.*, 1914, lxii, 1883.

12. Mayo, C. H. Causes of Failure in Gastroenterostomy. Collected Reports, Mayo Clinic, vi, 1914, 97.

13. Hartman, H. On the Functioning of the Gastrointestinal Orifice in the Case of Permeable Pylorus. *Bull. et mem. Soc. de Chir. de Par.*, 1914, xl, 798–804; also, *Annals of Surgery*, 1914, vol. lix, pp. 832–841.

14. Case, J. T. Röntgen Studies after Gastric and Intestinal Operations. *Jour. Amer. Med. Assn.*, 1915, lxv, 1628.

ADDITIONAL BIBLIOGRAPHY.

Legueu. *Bull. et mem. Soc. de Chir. Par.*, 1908, 156.
Petrev. *Beitr. z. klin. Chir.*, 1911, lxxvi, 305.
Legett and Maury. *Ann. of Surg.*, 1907, 549.
Kelling. *Deut. Zeit. f. Chir.*, 1901, lx, 157.
Kelling. *Archiv für klin. Chir.*, 1900, 288.
Tuffier. *Bull. et. mem. Soc. de Chir. Par.*, 1907, 463.
Reynier. *Bull. et mem. Soc. de Chir. Par.*, 1907, 471.
Jaboulay. *Lyon med.*, 1908, cx, 1328.
Mathieu. *Bull. et mem. Soc. de Chir. Par.*, 1910, 1028.
Ricard. *Congress française de med. Par.*, 1907, 269.
Berard. *Lyon med.*, 1908, 1210.
Guibe. *Jour. de Chir.*, 1908, i, 1.

VALUE OF PAIN, JAUNDICE, AND TUMOR MASS IN THE DIFFERENTIAL DIAGNOSIS OF DISEASES OF THE RIGHT UPPER QUADRANT OF ABDOMEN.

BY

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In differentiating the various diseases of the upper right quadrant of the abdomen, pain, jaundice, and tumor mass are the most frequent and striking symptoms, each of which is of great value in the conditions in which each one occurs, if the peculiarities and characteristics common to each condition are kept in mind. A diagnosis may be based on a proper interpretation of these symptoms. Upon the correctness of the observations of the symptoms depends the accuracy of the diagnosis. If the observations are correct, the diagnosis will be correct; if the observations are wrong, the diagnosis will be wrong.

It will be seen that pain, jaundice, and tumor mass—especially the first and last—are the most important determining factors in a differential diagnosis of diseases of the right upper quadrant. While I do not exclude other factors in making a differential diagnosis, the characteristic pain and tumor mass are the most important factors in the differentiation, certain lesions are often so situated and so obscured that a diagnosis is difficult—often impossible. There is no field in the domain of surgery where it is more important to place a proper valuation upon the patient's history, subjective symptoms, and the laboratory findings than in diseases of the right upper quadrant.

To differentiate the diseases in the right upper quadrant of the abdomen, it is necessary to differentiate the most important inflammatory and obstructive conditions producing pain, jaundice or tumor mass that affect the pyloric end of the stomach, pancreas, duodenum, liver, gall-bladder, bile ducts, kidney and appendix. The diseases affecting these organs are usually referred to individually and separately. They are not often treated as a group of organs whose diseases present a symptomatology very closely related.

These organs are at times closely situated, instead of being a good distance apart, as shown by their anatomical relation.

The usual symptoms of peptic ulcer are pain, vomiting, and hemorrhage, the most important of which is pain. Pain is the earliest definite symptom which is usually aggravated by large amounts of food and often relieved by small amounts. Pain may come on during the ingestion of food, but more frequently it comes on a few hours after meals and at night. Gastric ulcers are often characterized by periods of long remission. Intermittency takes place for long periods of time, during which the patient often believes himself well; then, without apparent cause, he finds that he has a return of the old trouble. Pain is more constant than vomiting; it usually precedes vomiting and is often relieved by vomiting.

Gastric analysis is important in working up these cases. If the gastric contents is more than 100 c.c., it is abnormal and indicates hypersecretion, spasm, and pyloric obstruction. The contents should be tested for continued hypersecretion and acidity. "About 70 per cent. show a hyperacidity; a few show a normal acidity; about 5 per cent. show a hypoacidity, and a few show lactic acid."

Occult blood will be found in a large per cent. of ulcer and is of great value in the diagnosis. Friedenwald says that the occasional presence of occult blood in the stool is suggestive of ulcer, but its continued presence from day to day is suggestive of carcinoma.

The *x*-ray examination will often be a helpful aid in determining the presence of peptic ulcer. Much valuable information may be secured by the röntgenologist, many of whom claim to diagnosticate 75 per cent. of ulcers.

Peptic ulcer diagnosis is usually based upon the presence of localized pain, followed by vomiting, frequent presence of occult blood in gastric contents or stools, hypersecretion, increased amount of gastric contents, reliable findings with the *x*-ray, and often a history of an old irritated dyspepsia.

Hemorrhagic pancreatitis is sudden and violent in onset. It is characterized by excruciating, deep-seated pain usually in the epigastrium or between the xiphoid and umbilicus, associated with severe nausea and vomiting, hiccough, constipation, and albuminuria frequently results, if patient does not die in speedy collapse.

Acute suppurative pancreatitis usually begins suddenly with severe epigastric pain, vomiting, hiccough, chills, an irregular pyemic temperature, and progressive tympanites. Prostration is usually great.

In pancreatic calculi paroxysms of pain may be due to the impac-

tion of stone. The pain radiates along the lower left costal border to the back rather than to the right side. Detection of free fat in stools or glycosuria may markedly aid in the diagnosis. Characteristic calculi found in the stool is confirmatory. Jaundice rarely appears in pancreatic lithiasis unless the stone passes into the common duct and becomes lodged. If this takes place, or if pressure is made upon the common duct by inflammatory swelling, jaundice may occur.

In cholecystitis pain may or may not be very severe, depending largely upon the amount of obstruction produced by the swelling in the ducts. If the obstruction is complete, the gall-bladder may become enormously enlarged, extending pear-shaped below the right costal margin to the umbilicus. Epigastric pain with local soreness beneath the right rib margin is usually followed by nausea and vomiting. When the common bile duct is occluded, jaundice with chills and high temperature may result.

Cholelithiasis may exist a long time without symptoms. I had a case:

A Mrs. I., thirty-five years of age, who had had five children. She gave a history of having had typhoid fever at fourteen years of age, but not until thirty-five years of age did she ever have a symptom referable to the gall-bladder. She was taken with severe pain in the epigastrium, with great tenderness over the gall-bladder. I operated and removed 165 gall-stones. Not until one of the stones became lodged in the cystic duct did she have trouble referable to the gall-bladder. When stones become lodged in the duct so as to obstruct the flow of bile or mucus, sudden pain of an agonizing character results.

Cholelithiasis is usually preceded by some remote infection—typhoid fever, dysentery, appendicitis and cholecystitis—and may come on suddenly or gradually. Pain usually begins in the epigastrium or beneath the right costal margin and is often referred to the right shoulder blade and down the arm and sometimes beneath the sternum.

If the stone lodges in the common duct, it prevents the free flow of bile and jaundice results. Chills with high temperature may develop in connection with extreme jaundice, which, if not soon relieved, will lead to a subnormal temperature, with slow pulse and white pasty stools.

If the gall-bladder should happen to be located on the left side, it would be difficult to differentiate by the pain and tumor mass from gastric tumor.

Renal calculus is accompanied with severe pain when the stone

gets into the kidney pelvis or ureter in a way to block the flow of urine. The pain radiates from the loin obliquely downward into the right iliac region, the front of the thigh, bladder or genital organs. Symptoms from renal stone depend upon the character and location rather than the size of the stone. The pain may appear suddenly and is of an agonizing character, associated with marked muscular rigidity or spasm. If the stone passes pain may suddenly cease, leaving the bladder more or less irritated. If the stone is rough, it may produce much irritation and hemorrhage. "If the ureter remains long blocked by a stone hydronephrosis marked by a tumor mass beneath the costal margin may be found. When suppuration occurs in connection with stone, pyonephrosis results and pus, blood, casts, and albumin may be found in the urine and septic symptoms may result."

The liver, when enlarged from hepatic abscess, may extend several inches below the rib border. When due to amebic or other infections, dull aching pains are present all over the abdomen. The pain is most active during the night or early morning. Indigestion, headache, lassitude, coated tongue, and a foul breath may be present. Loss of appetite, weight, yellow skin, and color may take place at times. Chills and rigors at times occur with pain and tenderness over the liver. If the abscess swelling is sufficient to only press on the bile radicles the jaundice is slight, but if the pressure is sufficient to obstruct the common or hepatic duct there will be marked jaundice.

Floating kidney pain of the right side is not so severe as that from renal stone and is localized in the right side of the abdomen. It is usually relieved by the patient lying on the back with head and pelvis elevated or on the right side with legs and thighs flexed upon the abdomen. Pain and discomfort are increased if the patient reclines on the opposite side. Severe exercise often gives rise to paroxysms of pain.

If the ureter is flexed or pressed upon by the descent of the kidney, pain will result. If a band of fascia or blood-vessel is abnormally located so as to drag across the ureter in the kidney descent, the patient may suffer pain in the loin which may be projected down along the ureter. When the attachments are loose enough to admit free mobility of the kidney, the ureter is not liable to kinking and the kidney remains symptomless.

A floating kidney may be found as a movable tumor anywhere from the costal margin to the pelvic brim. It is rarely tender, but when discovered by the patient it may cause great anxiety. It is not easily palpated in very corpulent or muscular subjects.

A good method for detecting a floating kidney is to have the patient's head elevated with the thighs flexed upon the abdomen and have a nurse turn the patient upon the unaffected side while at the same time the surgeon makes pressure under the rib border with one hand and with the other he palpates the abdomen. The kidney tumor may be made to pass up under the upper hand near the rib border. Another method consists in having the patient assume the back position with head and legs elevated, and take a deep inhalation, at the same time the side is grasped with the surgeon's left hand, while with the right hand he palpates the abdomen. In this way the tumor can be made to pass beneath the left hand.

Nephromata or hypernephromata (whether adenoma, papillary adenoma, cystadenoma, or papillary cystadenoma) cannot often be distinguished from floating kidney. With this tumor the kidney is usually tender to pressure but unaccompanied by pain. Nephromata may or may not be associated with sex abnormalities.

In appendicitis the pain in a large number of cases occurs at the epigastrium and then diffuses itself over the abdomen and generally localizes at or near McBurney's point. If the appendix is long enough to extend into the region of the gall-bladder and ducts, its inflammation may excite symptoms of cholecystitis or choledochitis and the pain may be at the rib border. If located behind the cecum, pain may be referred to the loin or the right rib margin. If in contact with the ureter, the pain may simulate that of renal stone. Regardless of its location, it is often the cause of gastrointestinal disturbances—pylorospasm, hyperchlorhydria and general intestinal irritation. Appendicitis is usually accompanied by temperature, high or low. In fact, in acute attacks elevation of temperature is the rule. I often doubt its existence when other symptoms are unaccompanied by fever.

Nausea and vomiting are usually present in most of these conditions but are not significant nor especially characteristic.

Jaundice is a valuable diagnostic sign. It appears in appendicitis and renal disease only as a result of sepsis.

Obstructive edema due to a duodenal ulcer near the ampulla of Vater sometimes results in closure of the common bile duct and may cause pancreatitis and jaundice.

Choledochitis and cholelithiasis are accompanied with slight or marked jaundice which may be of an intermittent or transient type. It may be so slight that an examination of the conjunctiva or a chemical examination of the urine is necessary to detect it. Pres-

sure by pyloric cancer upon the common duct may give rise to jaundice of a constant, progressing, intense type.

Peptic ulcers both of the stomach and duodenum are at times so infiltrated as to cause a tumor mass that may be felt in the median line or beneath the right rectus muscle which is, at times, very tender to touch.

Pyloric cancer produces a tumor that, at times, is freely movable upon full inspiration and separated from the costal margin by some depression. These cases are usually far advanced when the tumor is palpable—"firm, irregular, often painless, and not very tender to pressure."

When the gall-bladder is distended from obstruction to the cystic or common duct, it produces a pear-shaped tumor mass at the margin of the liver; movable synchronously with the diaphragm and unlike a pyloric cancer mass presents no depression between the rib margin and the tumor mass. It is usually more tender than floating kidney, pyloric cancer or infiltrated ulcer.

Appendiceal tumors may be located anywhere in the abdomen. The appendix is sometimes 6 or more inches long and may become attached to any other abdominal organ. When inflamed, it may become fixed by adhesions to some surrounding tissue. I recently operated on a girl eighteen years old with a left pelvic abscess. She had a pedunculated fibroid of the left side to which the appendix, 6 inches long, had become adherent, and had suppurated in the left side. On account of the various positions of appendiceal tumor masses confusion arises and errors in diagnosis may occur, as they often give symptoms common to the organ to which the appendix is attached.

Floating kidney tumors are usually marked by smooth, sharp outlines and mobility. They are usually free from pain and tenderness unless obstruction results from ureteral pressure.

A hydronephrotic or pyonephrotic kidney is usually stationary or fixed well back into the loin and does not move with the diaphragm. The hydronephrotic kidney usually presents no urinary findings, while the pyonephrotic kidney is usually accompanied by septic symptoms, the urine showing blood, pus, albumin and casts.

Pain is the most prominent symptom in all conditions of the upper right quadrant, and is of great value in a differential diagnosis, if the peculiarities and characteristics of pain common to each condition are kept in mind.

The pain of peptic ulcer has a definite relation to the intake of food; it is increased by the ingestion of large amounts of food and

lessened by small amounts. It is most severe between meals and at night. It is definitely localized in the epigastrium and frequently to the left.

Pain due to pancreatic calculus is usually paroxysmal and radiates to the back and along the left costal border.

Pain due to acute suppurative pancreatitis usually begins suddenly in the epigastrium, accompanied by nausea, vomiting, hiccough, chills, and irregular pyemic fever with great prostration.

Pain in hemorrhagic pancreatitis is sudden in onset, is deep-seated between the xiphoid and umbilicus, associated with severe nausea and vomiting, hiccough, constipation, and albuminuria frequently results if patient does not die in collapse.

Gall-bladder pain is most constant beneath the right costal margin and in the epigastrium, referred often to the right shoulder blade, down the arm and high up beneath the sternum. The pain is usually constant and paroxysmal and does not cross to the left as does gastric, pancreatic and appendiceal pain. If stone obstruction takes place, the pain may come on suddenly and frequently subsides suddenly, leaving the patient comfortable and well as if nothing had happened.

Liver abscess is accompanied by general abdominal pain, followed by localized pain and tenderness over the liver.

Renal stone pain is sudden in onset and is of an agonizing character, beginning in the loin and extending obliquely downward along the ureter to the bladder and thigh. If the obstruction is relieved, the pain suddenly subsides, leaving the patient as well as before, excepting at times a slight vesical irritation remains. Unlike gastric, pancreatic and appendiceal pain, it is never referred to the opposite side, and unlike gall-bladder pain it is never referred to the sternum, scapulæ and down the arm.

Hydronephrosis may present slight pain and tenderness on pressure. Pyonephrosis is very tender on pressure and often is accompanied by dull pain in the loin.

Appendiceal pain may come in paroxysms, severely or moderately colicky. It often appears in the epigastrium and localizes over McBurney's point. Wherever the position of a chronically inflamed appendix, pylorospasm and hyperchlorhydria may result, appendicitis pain may localize anywhere in the abdomen. If the inflamed appendix is located low in the pelvis, it resembles ovarian pain; if located far back under the rib margin, the pain is difficult to differentiate from kidney pain; if located at the liver border, the pain will simulate gall-bladder pain.

Regardless of every aid in diagnosis, it is often difficult to differentiate and, instead of waiting months or years for the trouble to clear up, an exploratory diagnosis under nitrous oxide gas-oxygen, or novocain should be made.

DISCUSSION.

DR. J. HENRY CARSTENS, Detroit.—We all recognize the difficulty in making a diagnosis in these cases. I read a paper the other day by a member of the Mayo staff, whose name I cannot recall, in which a report of their own work shows that they make over 10 per cent. mistakes in diagnoses. When we consider that patients pass through the hands of perhaps ten members of the Mayo staff and they make as many mistakes as that in diagnosis, what can be expected of us poor devils who are likely to make mistakes also, although we try to go through the same routine!

There are a few points in connection with this paper and subject that I want to bring out. There are more cases of trouble with the appendix, with symptoms in the right upper quadrant of the abdomen, in the region of the stomach and liver, than we have any idea of. Let us take, for instance, gall-stones, and what a difficult thing it is sometimes to make a diagnosis in a great many cases. They have no gall-stone colic, or very seldom do they have it. When a patient has occasional attacks of pain in the region of the stomach and liver, if that patient sleeps until 2 or 3 o'clock in the morning, when the stomach is absolutely empty, wakes up and has a severe pain in the region of the stomach, I make up my mind that he has trouble with the gall-bladder. These patients are very fleshy, and it is difficult to make an exact diagnosis of the condition which exists, and we should always advise, in a certain number of these cases, the making of an exploratory operation.

A valuable aid in the diagnosis of these cases is the use of the *x*-ray. If you have an *x*-ray apparatus, if there are gall-stones, and they contain a little over 3 per cent. of lime, you can see them with the *x*-ray. If they contain less than that, you cannot detect them with the *x*-ray, but with the *x*-ray and bismuth or barium, you can tell whether there is adhesion of the stomach, you can tell whether the pylorus is patulous; you can ascertain the position of the stomach and the intestines, and you can determine the condition of the appendix as a general rule. In a great many of these cases the trouble is in the appendix because that organ is malformed either congenitally or as the result of pelvic inflammation. In a great many cases it is postcecal, where you get no pain outside, and no rigidity of the muscle, and only by the deepest and hardest pressure can you find a sore spot, and if you press just as hard below and above you may strike with your finger a tender spot or a painful one. You press there to see if there is any trouble with the appendix.

I simply want to emphasize the point that we are not justified to-day in doing any operation, unless it be an acute case that requires it, until we get *x*-ray pictures of these cases.

DR. GORDON K. DICKINSON, Jersey City.—Even in the upper abdomen there is nothing orthodox. One has always felt that if you have obstruction of the common duct you are bound to have jaundice. I recall to my mind a case where there was a calculus impacted at the entrance of the duct into the duodenum. The common duct was as large as my index finger and distended with bile, so that it looked like a vein. On incising to remove the calculus an immense quantity of bile escaped and yet that patient did not have the least bit of jaundice.

I do not like diagnosing stones or calculi or operating for them. In the first place, if you do not find them, the people are very much disappointed; they want to see them because you have been talking about them and if you have not them to show they discount you. If you find three or four large stones that are making sufficient trouble to warrant operation and remove them, and some other doctor comes along and finds in another case a hundred or a hundred and fifty stones, he is regarded as the bigger surgeon.

DR. JAMES F. BALDWIN, Columbus, Ohio.—There is one point that was not brought out by Dr. Carstens relative to the matter of diagnosis in retrocecal appendicitis. In the vast majority of cases, when you have such a condition, you can by pressure elicit tenderness such as the doctor described; then tell the patient to keep the knee stiff and lift the right leg; as the psoas muscle contracts under your fingers, the tenderness becomes much more marked and the leg drops with an expression of pain from the patient. The appendix rests on the psoas muscle, and when brought up under the fingers gets pinched. I have made the diagnosis in this way over and over again, and have never failed to find a retrocecal appendix.

There is one town in Ohio where we are likely to find gall-stones in any patient who is sent for operation. We scarcely ever fail. A doctor from that town brought a patient to me with a large amount of pelvic trouble about a year ago. A careful examination of the abdomen failed to reveal any evidence of gall-bladder trouble. There was no stomach trouble, no pain, no tenderness, and I remarked that here was a case where we would not find any gall-stones. I did the pelvic work and then examined the gall-bladder, and there found what seemed to be one very large gall-stone. I removed the gall-bladder together with thirty or forty stones from the common duct. When I opened the gall-bladder after its removal it seemed as if a thick-walled gall-bladder containing a large number of stones had been filled with some fluid which had later become organized so that each stone was in a little pocket by itself, no two stones being in actual contact. When the gall-bladder was laid open and the stones removed, the inner surface of the bladder was very suggestive of the wax surface furnished by bee keepers to their bees for the building of comb.

DR. E. GUSTAV ZINKE, Cincinnati, Ohio.—Permit me to relate a case in which the gall-bladder contained 1884 gall-stones. They gave rise to no symptoms. This patient sought my advice for the relief of an excessive procidentia. She was subjected to a high

amputation of the cervix, an anterior colporrhaphy and a posterior colporrhaphy and perineorrhaphy. The abdomen was then opened and a hysteropexy, bilateral oophorectomy and appendectomy performed. Before closing the abdomen her doctor said to me: "I wish you would examine the gall-bladder. Three years ago this patient had what I believed a gall-stone attack; but she had no similar symptoms since." An examination of the gall-bladder showed it was of considerable size. The median incision was closed; the gall-bladder exposed in the usual manner and its contents removed. We found 1884 stones of all shapes and sizes. When this patient's history was taken she did not even hint having symptoms indicative of biliary disease.

Dr. James E. Davis, Detroit.—The essayist did not speak of one condition that is very confusing, and that is a hernia occurring above the level of the umbilicus. These hernias have an obscure symptomatology frequently. In some instances the hernia is so small that it is almost impossible to make a diagnosis.

Dr. William Seaman Bainbridge, New York City.—In reference to the paper of Dr. Davis, while I have no desire to decry the use of the *x*-ray, which he considers a most valuable aid to diagnosis, and which he employs constantly in suitable cases, I wish to emphasize the fact that even with the very best equipment and the most skilful operator the method cannot be considered infallible. I recall an illustrative incident which I witnessed a number of years ago in the London Clinic of Sir John Bland Sutton. The *x*-ray plates showed quite clearly seven stones in the right kidney. Upon this evidence, Sir John opened the kidney from pole to pole, but found no stone. Yet the *x*-ray pictures had been taken with the most up-to-date apparatus and by one of the most expert radiographers in London. Defects in the plates, accidents of one kind or another, calcareous deposits in the vicinity being photographed, are always to be reckoned with, as possible sources of error. In many instances the best interests of the patient are conserved by exploratory laparotomy rather than by waiting for *x*-ray plates or by depending upon them too greatly. They should be accepted as corroborative evidence or as adjuvant methods to supplement the clinical diagnosis.

Dr. Albert Goldspohn, Chicago.—With reference to the last speaker's experience about the kidney, I had almost identically the same experience. A patient was sent to a man whom I thought was the best *x*-ray man in our city, and he gave as his opinion that this is a kidney which contains calcareous material; it is an advanced tuberculous process, and there are very positive indications for operation. Acting on his opinion, when I cut in on that kidney I could not find anything the matter with it. I was perplexed, and studied for some minutes as to whether I should do anything further or not, or whether I should venture to remove it, which I did. There was no evil result and the patient's pain ceased. But I look at it merely as a matter of luck; and I might as well have gotten ignominy as credit.

In this matter of diagnosis in the abdomen, and particularly in

reference to epigastric phenomena, I cannot help but feel that I have been saved from some ignominious mistakes by admitting that the sympathetic nerve apparatus plays a hand in this game. I make mistakes, of course, as I also find some of the big men do. We must admit that there is a referred nerve influence or transmission of irritation from the pelvic organs to other parts in the abdomen or body.

In the early years of my practice in Chicago, Byron Robinson and I worked one winter together four evenings in the week, from eight to twelve o'clock, in the Post-Graduate Medical School, searching out these obscure sympathetic nerve ramifications in the body between the different organs and the several sympathetic plexuses. He was determined to find these lines of transmission, and he worked at it all the time. I shared with him the benefit of his work which matured in "The Abdominal Brain," that he published in later years.

How do we account for it that a child nursing at its mother's breast causes uterine contraction, if there is not a transmission of irritation or an impulse by way of the sympathetic nerve tract. You cannot say it is by way of the blood or lymph channels. Again, it is generally admitted that a chronic appendix is a source of irritation, and that it is a frequent cause of at least functional stomach disorder, if not of organic lesions there. Abnormal nerve impulses transmitted by way of the solar plexus seem to account for this much more rationally than to assume a constant stream of septic or toxic substance by way of the blood and lymph channels, and that this stream should be concentrated upon the stomach and not be disseminated to other parts of the body as well. Again, how otherwise than by sympathetic nerve transmission can we even imagine that some forms of dysmenorrhea have sometimes been promptly relieved by purely topical treatment of parts of the nasal mucous membrane. Many more instances that show the rôle of the sympathetic could be cited; nevertheless, many surgeons and internists persist in making fine spun diagnoses of gastric ulcers, etc., and even carcinoma of the stomach while ignoring the female pelvic organs entirely. And I have often seen these imaginary lesions promptly disappear after fulfilling a plain indication for gynecologic treatment.

Dr. Hugo O. Pantzer, Indianapolis, Ind.—Greater refinement of diagnosis is the supreme effort in medicine at this time. I would here call attention briefly to the common neglect of properly cultivating our tactile sense, as is being done by the blind. Paradoxically stated we, the seeing, practice a "blind" touch when we palpate or percuss with a force which practically annuls tactile sensation. A light touch as practised by the cultivated touch of the blind enables a reading for diagnostic purposes that is little short of marvelous to the uninitiated; and the same is true as applied to palpatory percussion. Form, position, consistency, tenderness of abdominal organs can be made out with a precision that often equals the specific information derived from the *x*-ray. Indeed, in single instance it may rival it, for example: a noted *x*-ray specialist referred his female cook to me for vague abdominal disease. Notwith-

standing the muscular, youthful abdominal wall, I was able to map out by touch and palpatory percussion the evidence of a moderate stricture of the upper ascending colon, with marked tenderness upon acute pressure at the site of the stricture, and considerable dilatation, thickening and tenderness of the cecum and adjacent ileum. This diagnosis was all-satisfactory to me. However, it being available, I asked for an *x*-ray examination which was gladly granted. Report came back "no intestinal obstructive lesion anywhere." I ascertained that the ordinary test meal had been given and its course observed through the entire length of the alimentary tract. I requested a bismuth enema, which, in turn, became demonstrative of a definite constriction about the hepatic flexure. The subsequent operation verified fully this finding.

Considering that not one physician out of a hundred has made an effort to develop his tactile sense in this higher meaning, and regarding the importance of this matter, it would seem that our medical college curriculum shall include instruction for this particular development of the tactile sense.

EXCESSIVE DRAINAGE COMPLICATING SURGERY UPON THE COMMON BILE DUCT.

BY

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In our usual routine work in surgery we are accustomed to the well-known difficulties and complications which surround us, and by full use of the knowledge which has been gained from personal experience and the teachings of others, we are enabled to exercise our best judgment to guide our patients by the possible complications incident to the condition from which they are suffering.

Quite different though—and much more startling—is it when, suddenly, there is drawn into our field of operative work some unforeseen complication, upon which there seems to be no definite knowledge, and in which no personal experience has been had. Such was my position with reference to the subject of this paper and the two cases which I will report.

During the past twenty years volumes have been written upon gall-bladder and gall duct surgery. The whole subject has been transformed and elucidated so that at the present time the surgery of gall-bladder and ducts is fairly clear-cut, and has ceased to give the anxiety it possessed in former years. Yet this somewhat new branch of surgery is not so far advanced, or so clearly defined, but what it is possible to meet with unexpected and unforseen conditions, such as are presented in the following cases.

Case I.—F. M., married, aet. forty-seven. Referred by Dr. C. J. McCambridge. Hospital No. 1064. Operation, January 31, 1911. Family history negative, except that mother died of cancer. Personal history; negative as to gonorrhea and syphilis. Free from disease up to onset of present illness ten years ago.

Patient has been a confirmed alcoholic for thirty years, and especially so during the past three years. For the last ten years he has suffered from severe gall-stone colic, averaging an attack every four to six weeks, and of sufficient severity to necessitate anodynes.

The attacks were typical in character and were diagnosed by the attending physician. During intervals between attacks he suffered from hyperacidity, flatulency, belching and inability to take certain types of food. The attacks increased in severity, and for months prior to admission to the hospital he had chills and sweating at irregular intervals, prostration and decided loss of flesh. An icteroid hue to skin was present, and upon admission to the hospital he had the appearance of a decidedly sick man. He was very sensitive to palpation in region of gall-bladder.

At operation, the gall-bladder was found much thickened and contained forty-six stones. The common duct was greatly dilated and contained twenty-six stones, several of which were the size of hazelnuts. They were removed through incision of duct. It was noticed that the head of the pancreas was enlarged and thickened. All stones were removed and drainage was established to both gall-bladder and common duct. Patient rallied nicely from operation, but within a few hours it was noticed that the drainage was excessive and continued to increase in amount to such an extent that, by the third day following operation, he was discharging from 3000 to 5000 c.c. daily, of a very light amber-colored fluid, which was daily becoming lighter in color. After removal of the drainage tubes, on the sixth day, the fluid excoriated the skin so that it became necessary to protect it with ointments. Patient did well until the fifth day, when by reason of the dehydration consequent upon excessive drainage he went into a state of collapse, of serious proportions, so that for a time death seemed imminent. He was rallied by large quantities of saline solution given intravenously and subcutaneously.

During the next two weeks the excessive drainage continued and he was kept alive through the administration of salines, subcutaneously given, in sufficient amounts to overcome the dehydration incident to the drainage. During all of the time he was nauseated and unable to take fluids by mouth. Many times during this period of excessive drainage he was in imminent danger, with usual symptoms of collapse (almost imperceptible pulse, cold extremities, sweating skin, etc.), but could always be rallied by timely administration of salines.

The excessive drainage continued for eighteen days and then ceased rather abruptly. The patient recovered and has remained well to the present time, and is completely free from any gall-bladder symptoms.

At the time of this unusual sequence, it was considered to be due to overactivity of liver cells incident to the intemperate and prolonged use of alcohol, and the associated pancreatitis was not considered.

The incident of excessive drainage from gall-duct surgery did not again present itself to me until April, 1916, when a similar experience was noted in the following case:

CASE II.—Edna C. H., aet. thirty-three, Millbrook, N. Y. Hospital No. 2122. Referred by Dr. H. D. Mackenzie. Married. Family history negative as to hereditary disease. Personal history free from syphilis, gonorrhea and alcoholism. She had never had any serious illness prior to onset of the present disease.

Admitted to the hospital on April 17, 1916, with a diagnosis of chronic cholecystitis and cholelithiasis, which had existed for nine years. During that time she had been subjected to severe gall-stone attacks, at intervals varying from a few days to several months. Of late, these attacks had occurred more frequently, and there was almost constant tenderness upon palpation under the right costal margin. There were the usual gastric symptoms, loss of flesh, chills, fever, sweating and slightly jaundiced hue to skin, indicating probable common duct involvement.

Operation, April 20, 1916, disclosed a much enlarged and thickened gall-bladder, which was filled with stones of varying size. Cholecystectomy was performed, but not until the greatly dilated common duct had been opened and from it had been removed sixty-one stones, some of which were as large as small cherries. It was with difficulty that the common and hepatic ducts were finally freed from stones. No palpable evidence of chronic pancreatitis was found. Drainage of common and hepatic ducts was instituted.

Patient rallied nicely from operation, but upon the day following it was noticed that there was more than a usual amount of biliary drainage, which steadily increased in amount, so that by the fourth day, subsequent to the operation, the amount was so excessive as to be alarming, and produced the usual symptoms to be seen when large quantities of fluid have been withdrawn from the body, such as very rapid and weak pulse, exhaustion and impending collapse. Patient was almost *in extremis* with cold sweating skin and ashen color, but was quickly rallied by timely administration of salines. The excessive drainage of a light amber-colored fluid, which seemed to well from the depths of the wound like a miniature fountain, continued for thirteen days and then gradually subsided.

During the period of excessive drainage she was continually in serious condition, but her death was prevented by the use of large amounts of saline solution, subcutaneously administered. She was nauseated all of the time and occasionally vomited so that her stomach could not be used. The drainage excoriated and digested the skin over a large area with which it came in contact and acted as though there was an admixture of pancreatic fluid in the outflow.

It is to be regretted that it was impossible to collect and measure the amount of fluid drained each day. The patient finally made a slow but satisfactory recovery.

The desperate condition in which these two patients had been placed, from a complication in gall-stone surgery, which to me was unusual and unknown, led me to make a search of the literature to

ascertain if other surgeons had noted and reported upon such complication.

A careful perusal of articles, back to 1899, on gall-bladder and duct surgery, as recorded in the Index Medicus and Surgeon General's Catalogue, shows no report of such a complication. Foreign literature, with the exception of Kehr (Die Praxis der Gallenwege-Chirurgie), was not consulted.

In an endeavor to get the individual experience of others, a letter was sent to a large number of the surgeons in America, who are prominent as operators in this particular field of surgery, containing the following question: "Has excessive drainage to a point of dehydration ever occurred in any of your operative work upon the common bile duct?" As a result of this inquiry, I have obtained affirmative replies from eight surgeons who have had this complication occur in one or more cases. Several report fatalities, while others were fortunate in being able to overcome the weakening results of dehydration by the timely administration of salines. Hence, the outcome of this inquiry was somewhat astounding in the fact that here was a fairly frequent and serious complication of gall-duct surgery which had not, to the present date, been reported in our literature.

In substantiation of the assertion that this is one of the complications of common-duct surgery to be reckoned with, I beg to quote from the following personal communications received from my letters of inquiry among surgeons:

W. J. MAYO, M. D., Rochester, Minn.—"I have seen a number of cases such as you speak of in which there has been excessive drainage from the common duct, and we have usually concluded that a certain percentage of them were due to regurgitation of the pancreatic juices."

GEORGE W. CRILE, M. D., Cleveland, Ohio.—"I have had, at least, one striking example of an excess drainage to a point of dehydration in an operation upon the common bile duct."

ALBERT J. OCHSNER, M. D., Chicago, Ill.—"I have had a case in which excessive drainage to a point of dehydration has occurred in an operation on the common duct where there was a large stone impacted just at the entrance of the duct into the duodenum. I gave the patient nothing by mouth except the whites of two eggs every four hours. I used a transfusion of 1000 c.c. of normal salt solution every night and morning and gave 1 ounce of liquid peptoids in 3 ounces of normal salt solution as a nourishing enema every four hours, and the condition disappeared in about ten days."

R. R. HUGGINS, M. D., Pittsburgh, Pa.—"In reply to your question concerning excessive drainage of the common bile duct, I beg to state that I have had several cases where the drainage was so

great that for a time I was much exercised about the effect because the weakness incident to such a great loss of fluid seemed quite alarming."

PARKER SYMS, M. D., 361 Park Avenue, New York City.—"Last winter I operated on a lady who had gall-stones and cholecystitis; she also had a large liver. There was no evidence of pancreatitis, and there was no stone in the common duct. She had intermittent jaundice. I removed the stones and drained the gall-bladder. About a week after the operation she suddenly began excessive drainage, for two days she drained more than 120 ounces in each twenty-four hours. Then the drainage ceased as suddenly as it began."

G. K. DICKINSON, M. D., 280 Montgomery St., Jersey City.—"I have had in gall-duct work excessive drainage of the bile that blistered the skin, producing desquamation all around the margin, very difficult to keep from infection, where the patient ran down hill rapidly. Though I have had no means of testing them, I felt that the drainage was as much from the pancreas as from the common duct."

In analyzing the histories of the two cases herewith reported, we note certain points of similarity, namely, they both were long standing cases of common duct infection and incomplete obstruction; the latter was a result of the duct's being filled with gall-stones to such a degree that they must have constituted an impediment to the normal and usual outflow of bile and, resulting from the obstruction, we had in each case well-marked dilatation of the common duct. In only one case was there an alcoholic history and likewise in but one case was there involvement of the pancreas. Hence these two conditions can be eliminated as complete causative factors. They cannot be disregarded as partial influencing conditions in provoking the excessive drainage. I am unable to state the positive cause for this peculiar and serious complication, but I am disposed to believe that we have a condition somewhat analogous to that seen in the surgery of the hypertrophied prostate gland, where, as a result of incomplete emptying of the urinary bladder, we get back pressure upon the ureters and kidneys, which, when suddenly relieved through operative intervention, results in an excess outflow of urine of low specific gravity, which is a well-known source of danger in a person debilitated by long continuation of the preëxisting disease. Is it not quite probable that in partial obstruction to the outflow of the bile, by reason of the common duct obstruction from stone, that we have a dilatation of the smaller biliary radicles in the liver? Increased back pressure, which, when suddenly relieved by operative removal of the obstruction, produces a condition of venous engorgement of the liver with resulting outflow of fluid which is more in

the nature of a transudation than an actual biliary secretion, and this coupled with a back flow of pancreatic fluid through the dilated duct, would account for the excessive drainage. Yet I will not presume to definitely determine the causative factor, for the object of this paper is not to analyze the condition, but to suggest that in our operative work upon the common bile duct we must consider the possibility of excessive drainage and be prepared to combat it before the patient becomes dehydrated to the danger point.

DISCUSSION.

DR. LEWIS F. SMEAD, Toledo, Ohio.—I wish to report a case of this kind. Mrs. B. F., a widow, aged twenty-eight, mother of one child, entered the hospital complaining of pain in her upper abdomen and of jaundice. She had been well the greater part of her life except for numerous attacks of pain in the region of the gall-bladder. Several weeks previous to the present attack she was operated upon for double pyosalpinx, and when she entered the hospital for the gall-bladder trouble there was a free purulent discharge from a suprapubic drainage opening. Owing to this discharge and the recent operation, it did not seem wise to operate upon what seemed to be a recurrent attack of cholecystitis. After some days, however, the patient was no better, and it was evident from the patient's general condition that she would have to have relief. The suprapubic drainage had stopped in the meantime.

On July 12, 1916, the abdomen was opened and the common and hepatic ducts with the gall-bladder and cystic ducts were found greatly dilated and distended. The common duct was half an inch or more in diameter. The common and hepatic ducts from the ampulla of Vater to the liver stood out very prominently and felt like large thrombosed veins. The gall-bladder and ducts together contained 250 c.c. of a light green watery mucus. There were five or six gall-stones present. The diseased gall-bladder was removed and a drainage tube fixed in the stump of the cystic duct.

The drainage from the cystic duct following the operation was very large, and was accompanied by a great deal of vomiting. After the first few days the amount varied with the fluid retained. The drainage appeared to be blood serum slightly tinged with bile. The patient's tissue seemed to dry up and shrink with great rapidity. At the time of her operation she was in good flesh and in three days she was terribly emaciated.

The treatment consisted chiefly in keeping up the fluid intake. Liquids by mouth were given as much as possible, and salt solution per rectum and under the skin.

The condition seemed to me to be an acute hydrops of the bile ducts extending from the ampulla of Vater to the smallest bile duct radicles. I am certain she had an acutely distended and palpable gall-bladder for at least a month before the operation.

When the drainage stopped the patient seemed to recover her flesh almost as rapidly as it was lost. At the present time, while she has gained her weight, yet the tissue is not firm and good, and the patient has not regained her strength. The bile drainage stopped and the bile appeared in the stools.

The following table is of interest in connection with this case:

July	Day No.	Drainage in	Temp.	Pulse	Resp.
12	1	24	100.0	140	18
13	2	76½	101.3	124	26
14	3	138	99.0	108	20
15	4	61½	99.3	120	28
16	5	49	98.2	126	18
17	6	40½	98.0	108	16
18	7	51	99.0	116	24
19	8	50	98.0	124	24
20	9	20	98.2	112	24
21	10	45	98.0	120	24
22	11	23	97.2	120	22
23	12	19	98.0	116	24
24	13	10	97.3	104	18
25	14	29	99.1	106	18
26	15	51	98.0	128	24

Tube out and dressing saturated.

I would like to emphasize one or two things in this case. In the first place, the pancreas was very hard. There was very little excoriation of the skin, no more than there would be from ordinary bile drainage, but I was impressed by the fact that there had been an acute distention of this gall duct which was very noticeable at the time. We know that the bile ducts become dilated and hypertrophied from chronic obstruction without destroying liver functions, but what do we know about the effect of acute dilatation and back pressure up into the liver? It is different in the kidney, and it may be that it is different in these cases.

Dr. Gordon K. Dickinson, Jersey City.—I have numerous cases of that kind that are bothersome to me, to the patients and to the nurses. I have an opinion, not a theory, simply a hypothesis, and that is, the pancreas is, you might say, anaphylactic to the bile backed into it, and brings about pancreatitis, so that anatomically between the bile and pancreatic ducts we have a flow of pancreatic juice into the ducts of the liver. We may have just this effect produced. The conditions existing macroscopically are not only a dermatitis digesting the epithelia on the surface around the orifice, but nonhealing of the wound. The fat is absorbed; the wound tends to gape, and it is with difficulty we are enabled to keep the wound from opening down to the peritoneal cavity. I have found a little trick which helps in these cases, and I am laughed at a good deal by my pro-

fessional brethren for speaking of it, and that is, Fleishman's yeast cake. Keep the surfaces covered with yeast. The pancreatic juice does not get at the tissues and is negatived largely by it.

DR. EMERY MARVEL, Atlantic City, New Jersey.—The importance of this subject seems very evident. When a patient has undergone a serious operation we consider it good judgment to instill fluid into the circulation. If that patient is losing daily 300 centimeters of fluid, how much more important it is that that fluid should be compensated for, as well as to supply additional demand.

According to the title of Dr. Sadlier's paper, the discussion should be limited to drainage of the common duct, but in discussing it I think we might with profit extend the consideration to drainage of all bile ducts. This loss of fluid is the same and it is equally important whether drainage comes from the common duct, the hepatic duct, or from the cystic duct. The doctor gives as a remedy for this condition, first, compensating fluid; second, supply of salines. I would like to add one other excellent remedy, and that is glucose.

In the drainage of the gall-ducts, or any drainage from the liver there is a loss of the sugar element. An instance came recently to my mind of a patient who showed a clinical condition such as this: Extreme prostration; a large amount of drainage, with low arterial tension, which naturally goes with loss of fluid; delirium; and extreme apprehension. Instillation of fluid in the veins helped; saline helped; but the greatest amount of good came when the stomach was washed and then filled with a solution of glucose.

The younger Gerster has called attention recently to the necessity for bile, and reports a case in which the common duct drainage of bile was extreme. He recovered the bile from the common duct drainage, and introduced it into the stomach by the stomach tube. He felt he had saved the patient's life by giving him this great quantity of bile. I would urge the importance of adding glucose as one of the remedies to be used.

DR. WILLIAM SEAMAN BAINBRIDGE, New York City.—Some years ago Mr. Charles Waugh, of the great Ormond Street Hospital, London, began to use with excellent results the plan of hydrating the patient previous to operation in severe cases where shock or other serious tax on the patient's vitality can be anticipated. I have employed the method with great satisfaction. A few days before operation the patient is given by mouth, after clearing out the bowels, glucose solution or dextrose water. Immediately after the operation glucose or dextrose water, with or without bicarbonate of soda, 1 dram to a pint, is introduced into the bowel by the Murphy drip, giving 40 drops per minute continuously until gas is passed, then half the time until the fluid is expelled, or until the urine is sufficient in quantity, and all signs of shock have disappeared.

DR. SIGMAR STARK, Cincinnati.—While I have never met with these extreme cases of excessive discharge from the gall-bladder or bile ducts after operation for gall-stones, I have met with some in which there was quite a profuse discharge of a light amber-colored

fluid as was described by the essayist. The explanation I have to offer for this condition is somewhat different from that of the essayist, and is in conformity with the opinion of Dr. Martin Fisher, physiologist in the Department of Medicine of the University of Cincinnati, namely, that it is the product of the epithelium of the gall-bladder. You will recollect that in the two cases described, in the first one there was a cholecystostomy, and that in place of bile there was this excessive discharge from the gall-bladder, and in the other case the same kind of discharge took place from the common duct drain. To my notion this is similar in character to the gastrosuccorrhea that we meet with in pyloric obstruction. There is an inflammatory swelling of the mucosa of the gall-bladder and cystic duct with occlusion of the latter in the one instance and a similar condition of the common duct mucosa in the other. This is in line with the experience I had in the treatment of these cases. For a day or two after draining the gall-bladder we would have a free discharge of bile, and then there would be very little of it, and after another twenty-four or forty-eight hours there would be none at all. The drainage tube in the gall-bladder intensifies the inflammation of the gall-bladder to such an extent that you finally have a complete obstruction of the opening of the cystic duct and then this copious amber-colored fluid appears together with a lot of tenacious mucus. To cope with this additional inflammation, I washed out the gall-bladder with normal salt solution, injected sterile olive oil, but apparently added to the disturbance. I was between the devil and the deep sea. I would take out the drainage tube, and after a day or two get a discharge of bile again, then when I reintroduced it there would be a recurrence of the same phenomena. To overcome this Dr. Fisher advised me to irrigate the gall-bladder with a 2½ per cent. solution of sulphate of magnesia with the idea of dehydrating the edematous mucosa. After thoroughly cleansing the viscus, the cavity was filled with the solution and the drainage tube clamped for about one-half hour. This procedure has given me excellent results in such cases. I am using it in a case like this just now. We prepare a 5 per cent. solution of sulphate of magnesia and dilute it with an equal quantity of hot water to get the proper temperature, and we inject it into the gall-bladder once or twice daily; usually after a couple of days the patency of the cystic duct becomes reëstablished, you get a flow of bile and are made happy. I have in one case added the internal administration of urotropin to this procedure, and whether it added to the efficacy of the treatment, I am not prepared to say.

Dr. George A. Peck, New Rochelle, New York.—I cannot add anything of value to the discussion of this paper except to call attention to another remedy to prevent excoriation from the pancreatic discharges as they occur in stomata of the upper intestines and in those gall-bladder cases where there is regurgitation of the pancreatic fluid, and that is the employment of MacDonald's skin varnish. MacDonald has devised a skin varnish as a substitute for rubber gloves. Last winter I had to treat a case in which there was a discharge of pancreatic fluid which caused digestion

of the skin of the abdomen. MacDonald makes a varnish for this purpose extra heavy, and you may apply it once daily. In this instance I secured a healing of the skin inside of a week. If you have not already used it, I would call your attention to it and ask you to try it.

DR. ELBRECHT.—I would like to ask Dr. Peck what the composition of it is.

DR. PECK.—I do not know the exact formula. It is essentially a gutta percha preparation which is combined with different oils which prevent it from cracking. It is elastic, it sticks to the skin and can be removed only by the use of acetone. But in these cases of excoriation with digestion of the skin you will not find it necessary to use acetone. The action of the digestive fluids is sufficient to cause it to crack and peel off and you can rub it away quite readily at the subsequent dressing.

DR. SADLIER (closing).—I am deeply obliged to the gentlemen who have so carefully and thoroughly discussed my paper. With reference to the discussion of Dr. Stark, I think perhaps he misunderstood me—or, at least, I may not have made clear the fact that my first case occurred some five years ago, when gall-bladders were not being removed as frequently as they are at the present time. In that case, I opened the gall-bladder and removed the stones from it, and later found it was necessary to open the common duct. Hence, drainage was established to both the common duct and the gall-bladder.

Following the operation, the greater amount of excessive drainage came from the tube located in the common duct. Of course, after the tubes were removed on the sixth day, we no longer knew from whence most of the drainage came.

In the second case a cholecystectomy was performed and drainage was entirely from the common duct.

In the case reported in the paper by Doctor Syms of New York drainage was directly from the gall-bladder.

I appreciate very much the theory which Dr. Stark has brought forth, as emanating from Doctor Fisher, but we have not been in the habit of believing that the gall-bladder was a secreting organ.

DIVERTICULITIS OF THE DESCENDING AND PELVIC COLON.

BY

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ONLY within the last decade has our attention been directed to diverticulitis affecting the lower colon. During this period the pathology of the condition has been carefully studied and we have, in consequence, to-day a clear conception of the pathological changes that take place. The surgical treatment of diverticulitis of the descending and pelvic colon requires further study and elucidation. There are several problems that remain to be solved, and to these we shall direct your attention.

Should we resect the diseased intestine in the majority of cases, and if so, what is the most desirable method of procedure in this location?

Should we be content with opening and draining an abscess, due to diverticulitis or, should we remove one or more of the diverticula present and close the opening in the bowel?

How should we proceed when we have an opening between the colon and the urinary bladder? Should we advocate colostomy above the diseased area and thus allow the subsidence of the inflammation, which so often has acute exacerbations?

A diverticulum is either congenital or acquired. It may be complete, involving all the coats of the intestine; or partial, affecting the mucous, submucous, and peritoneal coats alone.

Acquired diverticula are usually partial or false. They consist of a hernial protrusion of the mucous coat through the musculature of the intestine and are covered by peritoneum. Diverticula are found in any portion of both the small and large intestine. Those of the small intestine are, as a rule, of congenital origin; while those found in the descending and pelvic colon are usually acquired. The fact that the descending and pelvic colon is derived from the primitive hind gut, may account for this difference.

In studying the pathology of the pelvic colon, it is interesting to consider briefly its embryological origin. It is derived from the

hypoblast and mesoblast of the ovum, and the mode of development is as follows: When the embryo has reached the stage of development in which we find the neural canal formed and after the three layers of blastoderm have folded in, forming the head and "foregut," there is manifest, at the blind end of the enteric groove, a protrusion, which, eventually, develops into the hindgut or rudimentary rectum.

Up to the sixth week of gestation the large and small intestine constitute one cavity of practically uniform caliber, with the exception that the lower portion of the hindgut is a little more capacious. The colon, sigmoid and rectum increase in circumference more rapidly than the foregut, or small intestine, and more and more nearly approach the outer layer of the mesoblast and epiblast at the lower portion of the embryo.

Diverticulitis of the descending and pelvic colon is due to an infection in the walls of one or more diverticula. A diverticulum is the result of a pouching of the mucous membrane, through small portions of the colon. Fecal concretions accumulate in the diverticulum and produce ulceration, thus allowing bacteria to enter its walls, and setting up an acute or chronic inflammation of the surrounding structures.

The walls of a diverticulum have been found to consist of the following coats: The mucosa, which is found definitely atrophied near the proximal end of the lumen, where pressure has been greatest from the thickened intestinal wall; the submucosa or fibrous coat, which is thicker in the proximal than in the distal portions, and the circular and longitudinal muscular fibers which have been found thickened by fibrous infiltration to twice their normal thickness. The diverticulum itself seldom contains any longitudinal or circular muscular structures. They frequently contain hard, black, fecal concretions. Usually the walls of the diverticulum show evidence of a chronic inflammation in the mucous and submucous coats, the latter abounding in fat.

There is a hyperplasia of all the adjacent glands. The large inflammatory mass is caused by bacterial invasion through the walls of a diverticulum, resulting in peritonitis and inflammatory deposits. Fecal concretions frequently are a source of chronic irritation, and produce a secondary peridiverticulitis, which may be attended by the formation of an abscess.

The majority of cases are found in males over fifty years of age, who have a tendency to obesity, although two cases have been reported; one aged five, and the other twenty-two years.

Constipation is known to be a predisposing factor. It is thought that where the blood-vessels enter the wall of the intestine, weak points in the wall of the bowel were produced, thus allowing hernia of the mucous membrane through the muscular coats. However, if this were so, we should find these diverticula at the mesenteric border, while diverticula are found in any portion of the bowel, even directly opposite the mesentery. Tension from within, due to gases, and traction from without, due to the mechanical pull of adhesions, have been cited as causes in the production of diverticula. Evidently there is some weakness or loss of muscular tone in the muscle wall of the intestine to permit a protrusion of the mucosa through the muscular walls.

The symptoms, as a rule, are of sudden onset, with severe pain in the left iliac region, characteristic of a localized peritonitis; this may be followed by nausea, but seldom by vomiting. The symptoms are oftentimes spoken of as similar to those found in appendicitis; but localized on the left side, rather than on the right.

There is rise in temperature; localized tenderness on pressure; muscular rigidity, and a sense of resistance or a tumor mass can be felt to the left of the median line in the lower quadrant of the abdomen. At times, we have vesical tenesmus and frequency of micturition. There is an increase in the leukocytes, especially of the polymorphonuclear type.

The patient is suddenly attacked with severe pain in the left side, and later there may appear a definite tumefaction in the left iliac region. Upon deep palpation there is a sense of resistance, and the patient has a feeling of tenderness on pressure. The acute disturbance is likely to subside, to be followed later by recurrent attacks. We may have the formation of an inflammatory mass, due to periverticulitis, producing inflammatory thickening and adhesions to the surrounding parts.

Intestinal obstruction may be due to an inflammatory mass, resulting in angulation which constricts the lumen of the intestine. An abscess may form and necessitate opening through the abdominal wall, or the abscess may perforate into the bowel or the bladder, or a fecal fistula may result. These cases have been frequently diagnosticated as carcinoma; even after the gross specimen has been examined following resection and proved to be diverticulitis only on microscopical examination.

The occurrence of blood in the stools is an important sign in favor of carcinoma, while the absence of blood would lead one to suspect

diverticulitis. We should bear in mind also the possibility of tubercular or syphilitic disease.

A proctoscopic examination is of negative value except, in very rare cases, where intussusception has occurred. Cases thought to be carcinoma, in which colostomy had been performed, have lived for years and, in all probability, were instances of diverticulitis rather than malignant disease. The disease may be acute or chronic and many times it is of long duration. We may have perforation of the diverticulum with the formation of an abscess or a fecal fistula may result.

The most difficult complication we have to contend with is one where the diverticulum has become adherent to the bladder, and a perforation has taken place into that viscus, allowing gas or fecal matter to enter the same. We should not overlook the fact that diverticula have been known to undergo malignant degeneration.

A difference of opinion exists in regard to the efficiency of a röntgenological examination in the differential diagnosis of diverticulitis. According to Russell D. Carman of the Mayo Clinic, cases in which the diagnosis can be based on *x*-ray findings are extremely rare, and Schwartz of Vienna, in his monograph "Röntgen Diagnosis of the Colon," makes absolutely no mention of diverticulitis.

On the other hand, Case refers to thirteen diagnoses of diverticulitis made by him in the last few years of his röntgenological experience; but Abbe and Le Wald cite a case in which it was impossible to differentitate between diverticulitis and colonic neoplasm, even with the most refined *x*-ray methods.

According to Case, there can be seen in diverticulitis, after an opaque meal has been given, small rounded shadows in the affected areas, these being the residue of the opaque salts retained in a diverticulum. He mentions as identifying features the fact that these shadows always appear in groups and always maintain the same relation to each other, and states that they are best seen on the second or third day, and often show to better advantage after a barium enema has been given.

Carman points out that it is impossible to differentiate between a carcinoma and a diverticulum, inasmuch as there is present in both conditions a similar filling defect with an opaque meal, and he further states that ureteral stones, phleboliths or calcified glands give shadows, which are almost indistinguishable from those of barium-filled diverticula.

To overcome in part this difficulty, he advises a screen or plate examination before the enema is given. He considers the antero-

posterior view the best, inasmuch as diverticula usually occur near the mesenteric border of the bowel, at the point where the vessels enter, but suggests that as this is not always the case, screen and plate examinations be made at various angles of observation and advises also stereoscopic röntgenograms. He prefers the liquid enema to the opaque meal, on the ground that the former is more likely to fill the diverticulum and thus show it, while the latter is likely to scatter more or less through the bowel.

We believe that the röntgen examination will be of decided value in the majority of cases. One can eliminate appendicitis on the left side by a röntgenological examination, which would show the position of the cecum and possibly the appendix.

The surgical treatment consists in making a long left rectus or a muscle-splitting incision, similar to the McBurney, in the left iliac region. Through this opening the abscess may be drained, and in some instances the diverticulum removed, and the opening in the bowel closed. The diseased portion, which is usually not more than from 3 to 8 inches in length, may be excised and an end to end or lateral anastomosis made, or, the two stage operation may be employed, as follows: Withdraw through the wound a loop of the bowel containing the affected area and stitch together the walls of the normal bowel above and below this mass. The parietal peritoneum is then sutured to the two portions of bowel below the loop of intestine withdrawn. The diseased area should be removed with a cautery in about forty-eight hours. The openings in the intestine may be closed at some future time.

Should we find a fistula between a diverticulum and the urinary bladder, which is attended by the passage of gas and feces through the urethra, we should make a careful cystoscopic examination to determine the size and location of the opening in the bladder. After opening the peritoneal cavity, the colon and diverticulum are separated from the bladder, and the opening in the latter closed. The involved colon is then resected immediately, and an end to end or lateral anastomosis made, or the two stage operation may be resorted to. A lateral anastomosis is to be preferred to an end to end, on account of the greater tendency in the latter operation to leakage at the mesenteric border, due to the liquefaction of the fat between the leaves of the mesentery.

It is found desirable in certain cases, first to perform a colostomy above the diseased area to allow the subsidence of the inflammatory process, thus relieving this field of constant irritation, due to the passage of feces. We can then attack the disease with greater suc-

cess at some subsequent period. One should not attempt too much at the primary operation; we are, usually, dealing with an acute infectious process.

CASE I.—During the month of March, 1912, J. E., a male, aged forty years, with a tendency to obesity, had an attack of pain across the lower abdomen. There was no nausea or vomiting. He took a cathartic and went to his office. As the pain continued, he returned home at 5 P. M., took a dose of castor oil and went to bed. After his bowels moved, he felt better; but the pain returned again about

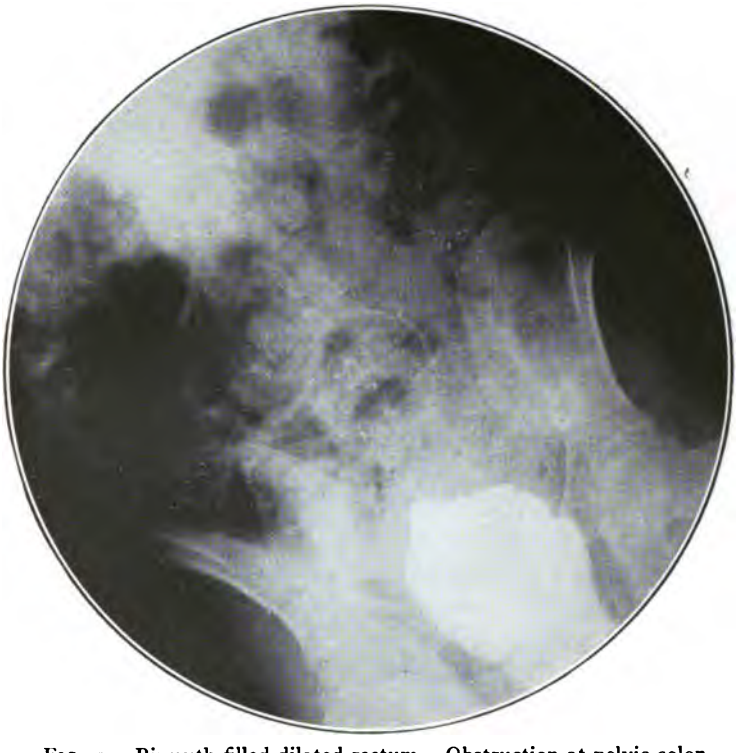

FIG. 1.—Bismuth-filled dilated rectum. Obstruction at pelvic colon.

midnight. He sent for a physician who said he had "inflammation." He remained in bed three days, and then resumed his work and felt well until September 8, 1912, six months later, when he complained of soreness in the left iliac region. His physician prescribed pills and enemas and, as he felt better, he went on an automobile trip for four days. He was able to attend to his business subsequently, but felt discomfort in the left lower abdomen. He then consulted a surgeon, who said he found "a bunch there." His physician thought he had

a rupture and referred him to me September 28. The patient said he had been having night sweats. His temperature was 100°, and pulse 96. A mass, tender on pressure, was palpable in the left iliac region, and a diagnosis of probable diverticulitis of the colon was made.

Operation September 29, 1912. An abscess, containing foul-smelling pus, was opened and drained for eight weeks. Small amounts of feces were discharged from the wound from time to time. The wound healed over; but during the next two years it became necessary to reopen it several times. The discharge each time contained

FIG. 2.—Barium filling diverticula.

pus and feces. Finally the wound closed. The patient regained his former weight and was able to attend to his business the greater part of the time. A mass could still be made out in the left iliac region, and I advised its removal; but, as he was "feeling well," he said he thought he would "let well enough alone."

On August 1, 1916, he commenced to have pain over the bladder region, and about August 20, he passed gas through his urethra. I saw him September 6. His urine contained pus and fecal material A cystoscopic examination revealed a small opening in the bladder.

There was redness, tenderness, and swelling at the site of the former operation.

September 7. Operation: Scar excised, pus and feces removed from a cavity 3 inches deep. The wound was thoroughly curetted and drained.

September 18. Left inguinal colostomy above the diseased area was performed to relieve the irritation from the feces, and give the inflammatory mass an opportunity to subside.

FIG. 3.—Barium enema. Dilated rectum. Obstruction at lower border of pelvic colon.

CASE II.—January, 1907, B. S., male, aged fifty-two years, weight 200 pounds. Has lost 26 pounds. Last August, while taking a shower bath, he was seized with pain in the lower abdomen, attended with nausea. He thought it was due to something he ate during the hot weather; but he has had more or less discomfort from time to time in the left lower quadrant. Two weeks ago he again complained of more acute pain in the left iliac region. I had him under observation for a period of one week. He had a tendency to constipation, and a feeling of discomfort in the left iliac region. Local tenderness on pressure; a sense of resistance, and the

suspicion of a mass beneath this area. Rectal examination was negative. Blood examination negative. Previous to that he had a slight chill and elevation of temperature. A diagnosis of probable diverticulitis, with a possibility of carcinoma or a left-sided appendix, was made by three different surgeons. Seven inches of the bowel found involved and resected by another surgeon, and an end to end anastomosis was made. He died on the thirteenth day of peritonitis, probably due to leakage at the site of the mesentery.

CASE III.—Mr. O. L., patient of Dr. F. V. Hussey, male, aged twenty-six, a Swede by birth. No history of tuberculosis or cancer in the family. Nothing remarkable in his past history excepting typhoid fever two years ago. Present illness dates back one year, when patient began to have intermittent griping pain across the lower part of the abdomen, with increasing constipation. Pain predominated in the left iliac region and across the sacral region posteriorly. Stools gradually became diminished in size and the pain, colicky in character, became more severe. For the last two months there has been, occasionally mucus and streaks of blood in the stools. There has been progressive loss of flesh and strength.

Patient was seen in consultation August 16. A mass, about the size of an egg, could be made out in the left iliac region; it was soft in consistency and movable. Nothing could be made out by rectal examination. Operation was decided on and the patient sent to the hospital. A bismuth enema was given and *x*-ray pictures taken which showed a mass at the lower extremity of the sigmoid with clean-cut edges and narrowing of the lumen of the sigmoid to about ½-inch.

An exploratory operation was done the following day. A firm, hard mass was found involving the lower part of the sigmoid and upper portion of the rectum; it was very firmly attached to the sacrum and left iliac bone. The left iliac vessels were involved in the mass. No enlarged glands could be felt. The mass, which was felt in the left iliac region before the operation, was a fecal accumulation in the sigmoid, proximal to the growth and not the growth itself.

Owing to the condition of the patient a removal of the growth was not attempted at once; but a loop of the sigmoid was brought up into the wound, which was a left rectus one, sutured to the margin of the peritoneum and the wound closed. Owing to the difficulty of obtaining a section of the growth, it was not considered wise to make the attempt. A tentative diagnosis of diverticulitis was made; realizing at the time, of course, that the growth might be malignant. The patient made an excellent primary recovery and, on the second day following the operation, the loop of bowel was opened and drainage established.

On the eighteenth day following the operation the patient began to have griping pain across the lower part of the abdomen with very little drainage from the colostomy wound. The condition became rapidly worse. The patient began to vomit and the obstruction became complete. The abdomen was again opened, this time through the right rectus muscle, and a loop of the ileum was found

caught down at the brim of the pelvis by a band of adhesion causing a complete obstruction at that point. The band of adhesion was divided and the loop of bowel freed. The wound was closed in the usual manner and the patient made an uneventful recovery.

In conclusion, we would emphasize the following points: The symptoms found resemble those of appendicitis, but with the local manifestations on the left side. The value of röntgenological examination. The importance of differentiating diverticulitis of the colon from carcinoma, tuberculous or luetic growths. Do not attattempt too much at the primary operation. The two stage operation is often preferable. Temporary colostomy may be desirable. Conservative surgery is of the greatest value in this disease.

DISCUSSION.

DR. O. H. ELBRECHT, St. Louis, Mo.—The subject chosen by Dr. Keefe deals with a condition that is comparatively new and perhaps one of the most interesting clinical chapters that has developed in recent years. If you will review the literature you will be fascinated by its pathology. The first complete article published in this country was by Sir Maxwell Telling of London and appeared in the *Proctologist* in 1910.

Telling made a most careful study of the gross and microscopical pathology, also the clinical side of it. He showed that it was a herniation of the mucous membrane of the large bowel through the interlacing muscular fibers into the peritoneal coat and that it could exist anywhere from the cecum to the rectum. The most common seat of the disease, however, seems to be the sigmoid with a special selective affinity for the spaces under and into the fatty epiploica. When fecal concretions escape into such herniations they present a clinical picture identical with acute appendicitis excepting the fact that the disease is located in the left lower quadrant instead of the right. If rupture does not occur and they escape general peritonitis but instead a chronic inflammatory process with much induration and infiltration results. This after a long period develops into a small tumor resembling carcinoma. This is usually constant and is practically the only clinical evidence found between acute attacks.

In differentiating from carcinoma you will find that it does not produce emaciation or hemorrhage even though there is a marked stenosis of the lumen of the bowel. It is also more common in obese subjects afflicted with constipation and this is given as one of the causative factors as there is a large amount of fat on the bowel which weakens the musculature and thus permits the herniation to take place. Whenever you examine a patient with a tumor in this region you must keep this condition in mind, more especially in healthy looking subjects with constipation. I shall not attempt to mention the many complications that can occur as the time allowed

me would not be sufficient, but merely ask you to read Telling's article which will prove intensely interesting and give you a thorough understanding of this new pathology.

DR. WILLIAM SEAMAN BAINBRIDGE, New York City.—May I ask Dr. Keefe whether this man was given bismuth by mouth?

DR. KEEFE.—Yes, he was.

DR. BAINBRIDGE.—How many hours after the ingestion of the bismuth was the picture taken? These questions are very important for us to have on record because this is such an important subject, and many of us believe it is absolutely the end result of a chronic intestinal stasis above Lane's kink, and I would like the record to show the points of time of these things in order that we may interpret the *x*-ray correctly.

DR. KEEFE.—It was taken twenty-four hours after a barium meal.

DR. BAINBRIDGE.—With reference to this line running down to it, would you interpret that as the small or large bowel? You have stasis in a mobile cecum and with a band across here. Is that in the small bowel? If it is, it is one of the most pronounced cases of intestinal stasis from an *x*-ray standpoint that I have seen. Is that obstruction, Dr. Keefe, entirely above the Lane's kink—in other words, above the brim of the true pelvis?

DR. KEEFE.—It looks to me it is about at the brim of the pelvis.

DR. BAINBRIDGE.—It is above the Lane's kink.

DR. KEEFE.—Above the brim of the pelvis I should say.

DR. BAINBRIDGE.—These two points are established as a secondary condition.

DR. KEEFE.—I merely wish to emphasize the fact that we should bear in mind that there is such a disease and be on the lookout for it. We should not say everything in the left iliac region is cancer, because many of these people can be relieved, and if we are in a position to diagnosticate them early, we may have better results than if we wait, we have a mass as large as two fists in the left iliac region.

It was my hope that we would elicit some discussion with reference to the advisability of different methods of procedure.

The first specimen I saw was at the Mayo Clinic. I was told that Dr. White, of Philadelphia, Professor of Surgery, who has died since, went there and had this mass excised, and Dr. Will Mayo thought it was a carcinoma; but Dr. Wilson, his pathologist, on making a serial section found it was diverticulitis, and I saw that specimen. That I think was the first case they had had of diverticulitis.

The primary operation of an end to end anastomosis seems to be a dangerous one as the mortality has been very high. It would seem to me that a two stage operation would be far preferable. It is better to have a patient alive, although he may have some disturbance, than to have him die from too much surgery done at the first operation.

With reference to colostomy, there is a great difference of opinion about it. Some men would just as soon be dead as to have a

colostomy done. I have a patient, a doctor's wife, with intestinal obstruction on whom I operated in the country at one time, some six years ago, and she recovered from that temporary obstruction of the bowel, and I suggested later that we try and close that and remove the diseased area, but she said no; it does not cause me great disturbance. I have examined her from time to time. This woman's husband practices in the country; she drives several miles to a railroad station, attends store all day, returns at night, and drives to her home.

THE TECHNIC OF ABDOMINAL HYSTERECTOMY.

BY

J. F. BALDWIN, A. M., M. D., F. A. C. S.,

Surgeon to Grant Hospital, etc., Columbus, Ohio.

(With thirteen illustrations.)

THE technic of hysterectomy has been a matter of steady evolution. The principles of the operation have been long established, but there are little details which have not been brought out and which may add materially to the satisfaction of the operation and to its safety. Most operators have felt that an abdominal panhyster-

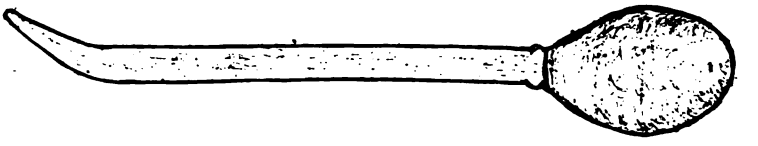

FIG. 1.—Glass tube with bulb for injecting iodine into the uterus.

ectomy was considerably more difficult, and had a materially higher mortality, than the subtotal or supravaginal operation. By the technic which I have finally developed, as the result of 2018 operations for the removal of the uterus, I feel that the complete removal is almost as simple, and fully as safe, as the less com-

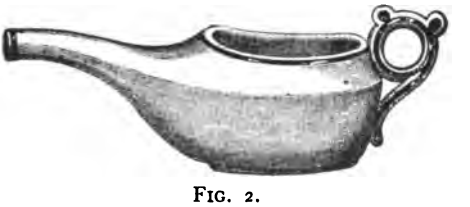

FIG. 2.

plete procedure, while it entirely removes the possibility of malignant changes in the retained cervix, and more or less morbidity from inflammatory or degenerative changes which may be present, or which may occur, in the part that is left behind. The steps of the operation are as follows:

1. Thoroughly wash out the vagina with soap and hot water. This is done when the patient is under the anesthetic, and advantage should be taken of the opportunity to make a more thorough examination of the pelvic organs than was, perhaps, possible without anesthesia. Seize the cervix with a volsella, and fill the uterus with full strength tincture of iodine by means of an appliance, made for this purpose, shaped something like a large medicine dropper (Fig. 1). The iodine should be applied as well to the outside of the cervix. The cervix, which had been pulled down somewhat

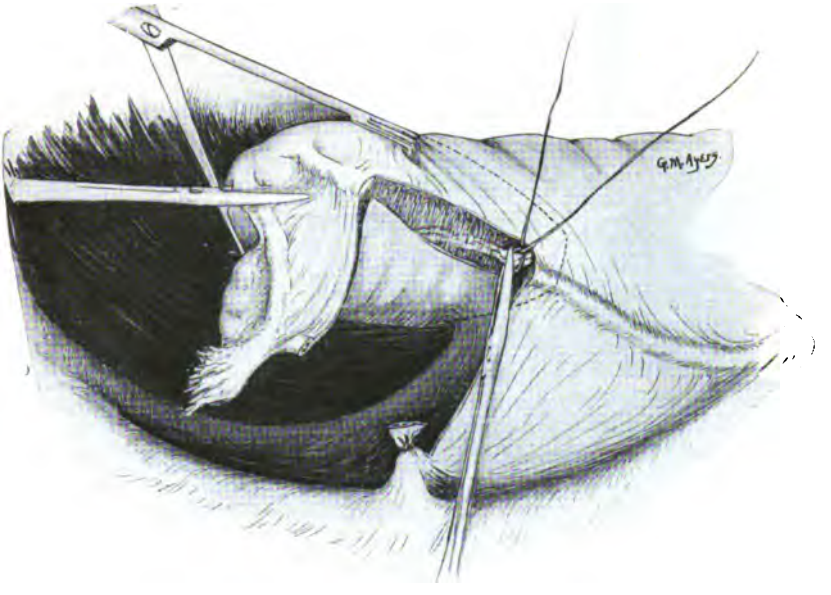

FIG. 3.—Cutting and ligating right infundibulo-pelvic ligament.

to steady it, is now pushed up, and by means of a feeding cup (Fig. 2) an ounce or two of tincture of iodine, reduced to one-fourth its normal strength, is poured into the vagina. By a sort of pumping motion with the volsella this iodine is spread over the walls of the entire vagina. The volsella is then removed, and by means of gauze the excess of iodine is wiped out of the vagina.

2. Open the abdomen by the usual incision, place the patient in the Trendelenburg position, and wall off the intestines by gauze sponges. The uterus is seized by a tumor clamp and thoroughly pulled up, so as to bring the cervix as close as possible to the abdominal wall. A hysterectomy clamp (Fig. 3) is placed on the infundib-

ulo-pelvic ligament, just outside the right ovary (I always stand on the right side of the patient) and a second clamp is placed at the horn of the uterus so as to catch the uterine artery at that point. An incision is made inside the first clamp, the scissors turning at a right angle at the end of the clamp so as to cut back, for a ligature, the tissues between the point of the clamp and the round ligament. (If an ovary is to be saved the first clamp is applied so as to catch the ovarian ligament and the Fallopian tube close to the uterus. Later the tube is detached from the ovary and a ligature applied.)

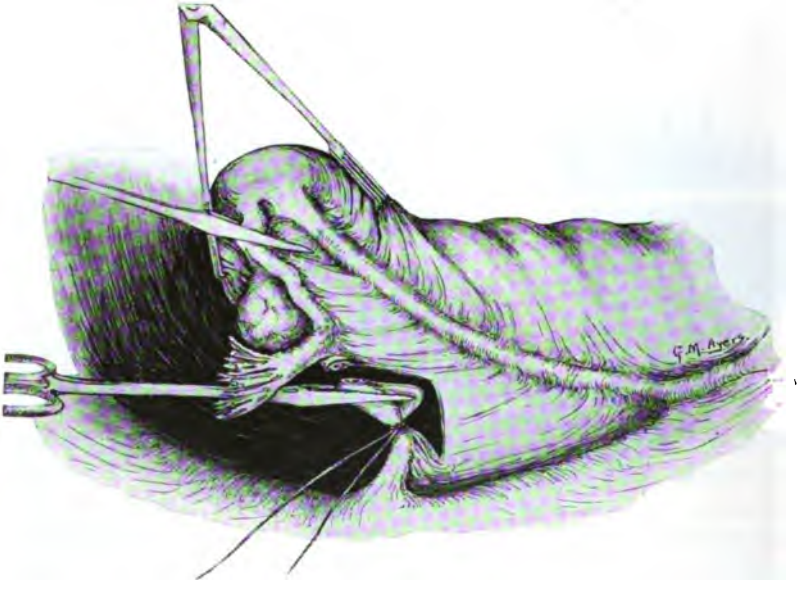

FIG. 4.—Ligating uterine artery. No bleeding from round ligament.

3. Cut the round ligament close to the uterus, and dissect the parts down to a point corresponding to the internal os. This exposes the uterine artery which is caught with a hemostat (Fig. 4) and cut. The same maneuver is executed on the opposite side.

4. Ligatures are applied to the ovarian and uterine arteries, and the clamps removed. Four ligatures have controlled hemorrhage. There is no hemorrhage whatever from the cut end of the round ligament—notwithstanding that all of our text-books show the round ligaments carefully ligated as though hemorrhage would otherwise take place.

5. The uterus is pulled forward, and with scissors the peritoneum is incised transversely just above the point of attachment of the

utero-sacral ligaments (Fig. 5), and dissected down for half or three-quarters of an inch, being careful not to button-hole it. This peritoneal flap is then caught with a hemostat so as to hold it out of the way.

6. The uterus is pulled backward, and the peritoneum from in front of the cervix is carefully dissected down with scissors, carrying with it the bladder. The vagina is freed by snips with the scissors and gauze wiping on the sides as well as in front. Here occasionally a little artery will need to be caught and tied.

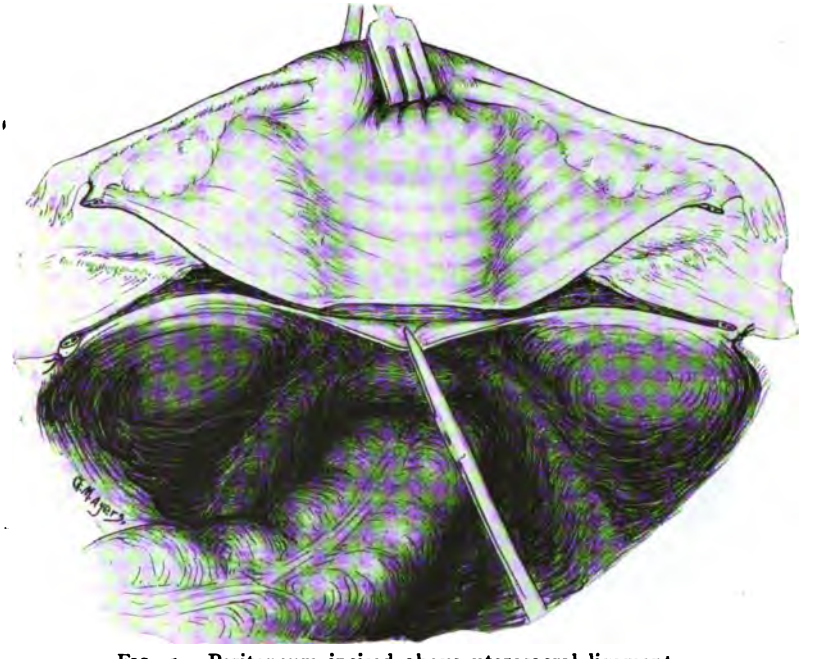

FIG. 5.—Peritoneum incised above uterosacral ligaments.

7. The vagina having been well exposed, and being directly under the eye, is caught with a hysterectomy clamp placed transversely just below its attachment to the cervix (Fig. 6), and with scissors the vagina is opened by a transverse incision above this clamp. Air enters the vagina and it at once balloons. Another hysterectomy clamp then catches the anterior wall of the vagina at right angles to the cut which has been made, and the clamp previously applied is removed (Fig. 7). Gauze is then pushed into the opening so as to absorb any iodine which may have been expressed from the uterus during the manipulations.

8. The finger is introduced through the opening into the vagina, or a strong hook, and by means of traction and scissors the vagina is separated on the side next the operator to a point in the posterior wall directly opposite the clamp which has caught the anterior wall. The assistant applies a second clamp at this point, and then the incision is completed around the cervix and the uterus removed. This leaves the vagina gaping wide open, but held up firmly by the clamps applied to the front and back (Fig. 8). If there is any

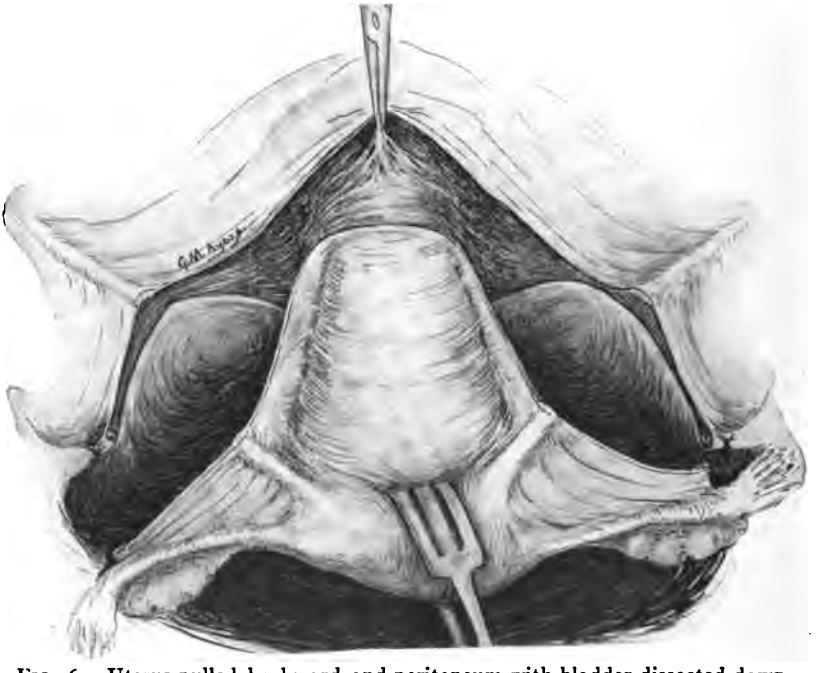

FIG. 6.—Uterus pulled backward and peritoneum with bladder dissected down over the vagina.

bleeding from the edge of the vagina the bleeding vessels can be readily caught and ligated.

9. A curved needle, threaded with chromicized catgut (I usually use No. 1 double), is passed from within the vagina out on one side, through the round ligament which has been caught at its end by an assistant and pulled directly inward, and returned from without in, entering the vagina a quarter of an inch from its first point of passage. The end of the round ligament is pushed down into the vagina by the assistant, the ligature tied, and the hemostat removed (Fig. 9). The same procedure is executed on the opposite side. This leaves

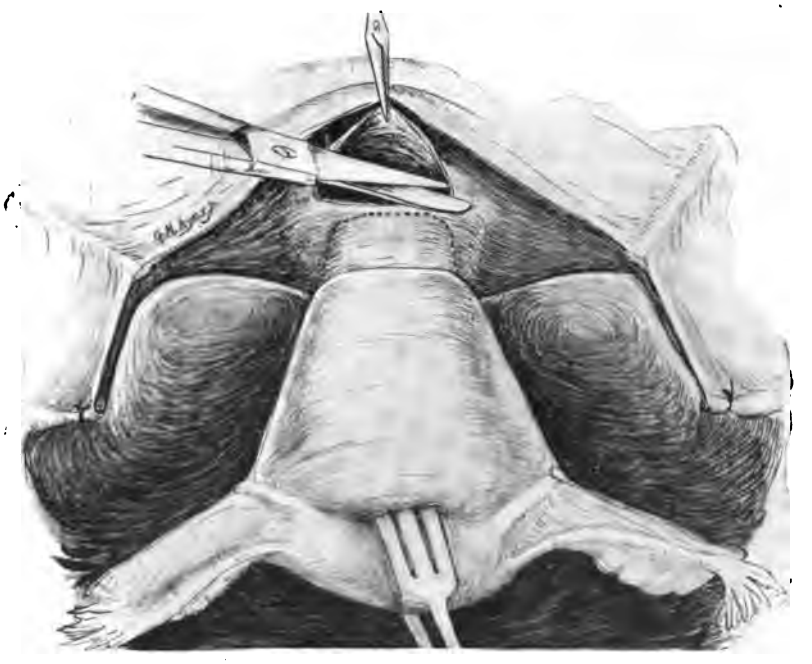

FIG. 7.—Opening vagina in front.

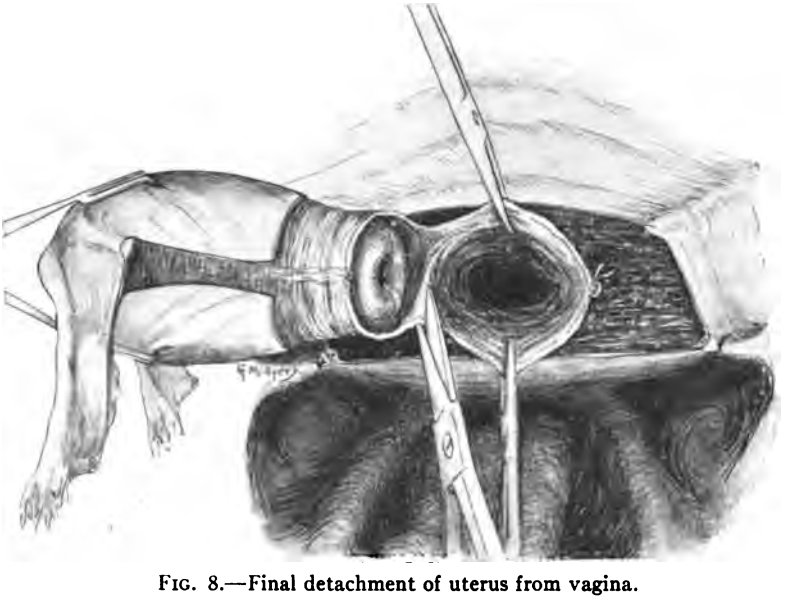

FIG. 8.—Final detachment of uterus from vagina.

the vagina held up by the hysterectomy clamps front and back, and by the round ligaments on each side.

10. A chromicized catgut suture is passed in and out in the submucous tissue around the end of the vagina, not penetrating the mucous membrane, and under each round ligament (Fig. 10). The assistant removes the clamps and this purse string suture is tied, the ends of the round ligaments and the edges of the vagina being

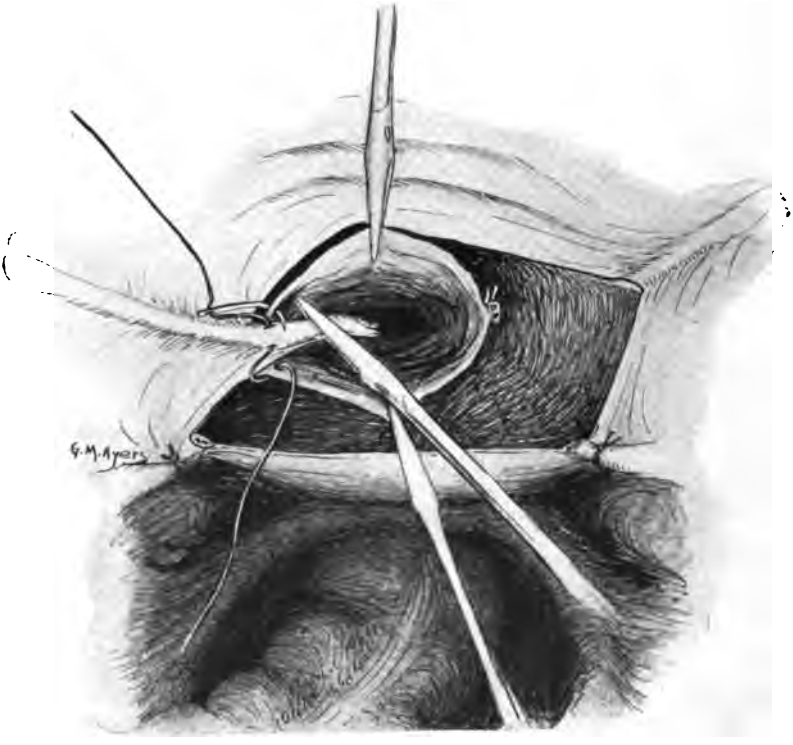

FIG. 9.—Implanting round ligaments into the vagina. Note knot on the inside.

pushed in by the assistant by means of an inverter (Fig. 11). This thoroughly closes the end of the vagina, and brings the round ligaments, and in part the broad ligaments, into close apposition in the midline (Fig. 12).

11. With iodine catgut the peritoneum in front and back is brought together by continuous suture, commencing above the stump of the ovarian vessels on one side, continuing across and up to a corresponding point on the opposite side. By catching the peritoneum by a sort of Lembert suture the raw edges are all inverted

and the floor of the pelvis is left perfectly smooth (Fig. 13). The appendix is then removed, the parts examined for adhesions, kinks, gall-stones, etc., and the incision closed in the usual manner.

21. The gauze which was pushed into the vagina from above is now removed from below, the vagina wiped out, and a piece of iodo-

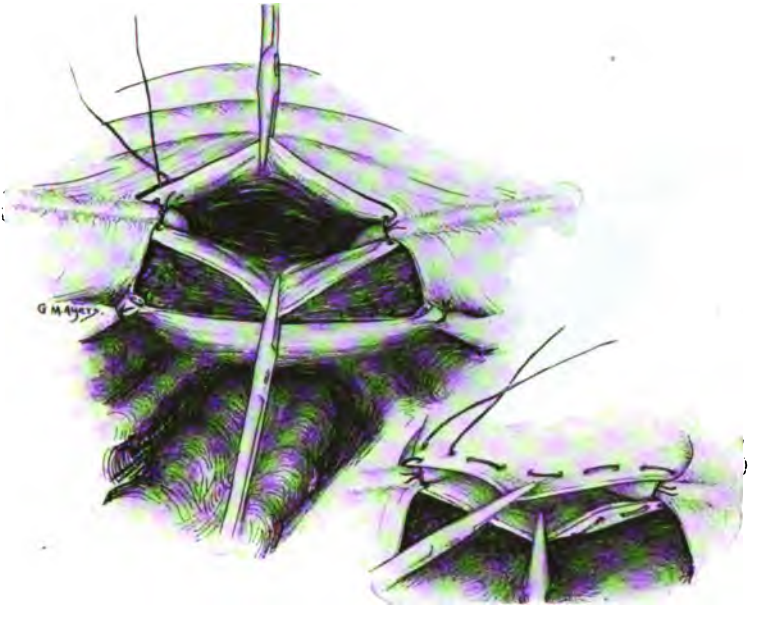

FIG. 10.—Both round ligaments implanted and pursestring inserted passing under each round ligament so as to bring in the broad ligament.

form gauze passed in and pressed up to the vault so sa to absorb any oozing, and to furnish support to the vault in case of postoperative vomiting. This gauze is removed at the end of two or three days, and the parts then kept clean as usual.

FIG. 11.

The main advantages of this technic are:

1. Quite satisfactory sterilization is made by the iodine of the uterine cavity and of the walls of the vagina.

2. The parts from start to finish are held up so as to be thoroughly under the eye, and within easy reach for controlling hemorrhage.

3. The smooth closure of the pelvic floor leaves no point for adhesions, hence no postoperative ileus.

4. The work is done rapidly because of the complete exposure of the parts and their being within easy reach.

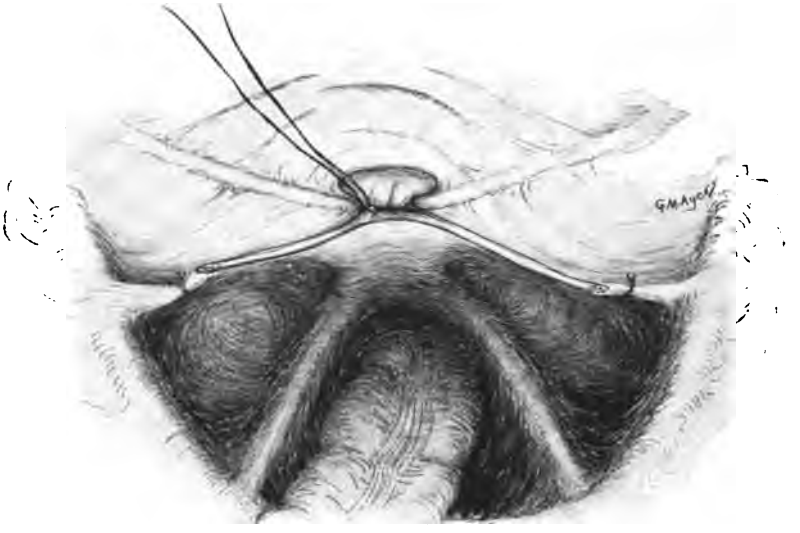

FIG. 12.—Purse string tightened bringing the parts into close apposition.

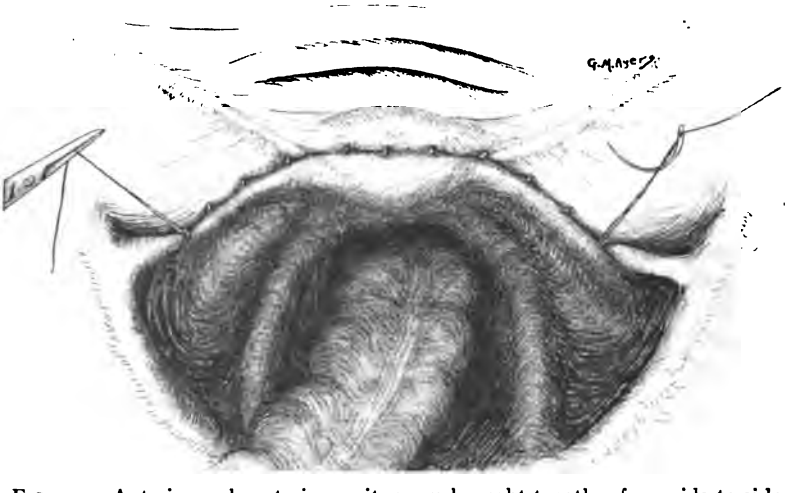

FIG. 13.—Anterior and posterior peritoneum brought together from side to side leaving absolutely no raw surface.

5. The support of the vault of the vagina is most satisfactory and complete.

In cases in which owing to extensive adhesions the peritoneum

cannot be whipped over, the sigmoid should be mobilized and attached to the peritoneum in front so as to cover the raw surface. In cases in which pus is present, or oozing is feared, the round ligaments are implanted in the vagina as previously described, but the posterior wall is then split downward for a distance, and the true pelvis lightly packed with a washed piece of iodoform gauze of ample size, one end of which has been pushed down into the vagina so that it can be removed from below; over this gauze the sigmoid is mobilized as described above. The gauze is removed in about one week.

In cancer cases the ligation of the internal iliacs, exposure and protection of the ureters, and other necessary steps of the radical operation are carried out in the usual way, but when possible with implantation of the ligaments into the shortened vagina so as to prevent its prolapse.

The above technic I have used for several years, and have found it to be ideal, both in immediate execution and in end-results.

INGUINAL HERNIA ATTACHED TO CORD, UNDESCENDED TESTICLE, UTERUS TUBES, AND BROAD LIGAMENTS.

BY

EDMUND D. CLARK, M. D., F. A. C. S.

Indianapolis, Ind.

THE following case is recorded, first, because it is a very good example of "pseudo-hermaphroditism" and, secondly, because it illustrates, what must be an exceedingly rare—contents in the hernial sac of a male.

The patient was thirty years of age. Family history negative, except that one younger brother has a double hernia with undescended testicles.

Personal History.—Patient had never had a serious illness. He had never had mumps. His mentality is above the average. He has succeeded in accumulating a comfortable fortune in the manufacturing business. His habits and activities are those of a normal man. There is an entire absence of any history of abdominal pain or crises suggestive of retained menses, and there has never been any bleeding from the penis. He has had normal sexual desire. He has been married for six years to an apparently normal woman, twenty-five years of age. She gives no history of pelvic inflammation. She has never been pregnant, although no precautions have ever been taken to prevent it. His weight is 175 pounds, height 5 feet 8½ inches. He is inclined to be fat. His beard is thin, but he has the features of a male. His shoulders, arms, breasts and trunk are those of the male type. An abundance of hair is present on his abdomen, and it has the normal distribution of a male.

Rectal examination revealed the presence of a prostate. There are no abnormalities of the penis. The scrotum is small and does not contain testicles or cord. The perineum is not dimpled. On examination the heart, lungs and abdomen are entirely normal. A large left inguinal hernia was found. The opening into the abdominal cavity was large enough to admit two fingers. The patient was operated upon January 19, 1915. Gas oxygen with novocaine was used as an anesthetic.

A transverse incision was made over the external inguinal ring. The sac was located and isolated by sharp dissection. It was opened and found to contain omentum, intestine and what appeared to be a band attached to the posterior wall of the neck of the sac. This

was pulled upon and a mass was delivered upon the abdomen which proved to be a uterus, broad ligaments, tubes and a testicle. The uterus was about one-fourth the size of a normal uterus of an adult female. Between the peritoneal surfaces of the broad ligaments there was a plexus of large veins. The testicle was attached to the broad ligaments, but was not supplied with a vas deferens. The mobility of the mass was remarkable. It was found that the testicle had no other attachment except that to the broad ligament. To have separated the testicle from its attachment to the broad ligament would have entirely destroyed its blood supply. The entire mass was removed and the ring completely closed.

Section of undescended testis. Organ is normal in size and consistency, and microscopic section revealed a histological picture characteristic of a normal organ. The blood supply is normal, and the cells of the seminiferous tubules show mitotic figures.

Section of suspected uterus. The wall of this structure consists of a thick mass of unstriped muscle fiber and connective tissue. The outer portions of it embrace many large blood-vessels with thick walls and engorged with blood. Without this vascular layer, unstriped muscle and connective tissue is seen, the latter embracing bundles of the former, cut in all planes and showing a relatively large amount of muscular substance about the nucleus of the fibers. In the connective tissue are many small blood-vessels with well-developed muscular wall and a normal endothelial lining, the cells arranging themselves into plugs or nests rather than as true tubules, but in some instances showing an attempt at lumen formation, and some of the cells being distinctly columnar in type and showing inclusions of a substance apparently in the nature or a secretion.

A section from the large fan-shaped appendage on either side of the supposed uterus shows the wall consisting of connective tissue and large and small blood-vessels, while the inner portion show as very much plicated lumen lined with ciliated columnal epithelium and having a highly cellular and richly vascularized submucosa. In some of the tubules a homogenous substance in the nature of a secretion is seen, and in one area the cells are of mucous-bearing type.

L. R. BRAITHWAITE, and W. CRAIG(1) report a case of

HERNIA OF THE UTERUS, VAGINA AND FALLOPIAN TUBES IN A BOY.

The patient was a boy fourteen years of age. The external conformation of this boy was perfectly normal. There was some growth of pubic hair; the penis was unusually large and perfectly formed. There was no alteration in the formation of the scrotum and the perineum was not dimpled. The right testis had not descended; on the left side there was a normal-sized testis, lying horizontally at the bottom of a hernial sac which reached to the lowest point of the scrotum. The sac contained what was thought to be omentum, which could be traced up to the internal ring as a thickened cord. The usual oblique incision was made in the left inguinal region and the hernial sac exposed. Slight traction resulted in the delivery of the whole sac on to the surface of the left thigh bringing with it the left testis.

An incision was made into the sac and the testis, lying horizontally, was drawn upward; with it there appeared a perfectly formed Fallopian tube, having no apparent direct connection with the testis. Pulling the testis downward brought into view the whole of the internal organs of generation of a female, with the exception that the positions usually occupied by the ovaries were filled with testis. The uterus was deep red in color and the normal size for a female of his age; it lay between two layers of peritoneum, was slightly bicornuate, and traces of round ligaments passed away from its two corners forward. The lower part of the uterus ended in a thickened cone at the cervix, and from this there passed off a wide band of fibrous tissue in the position of the vagina; this band of tissue ran up into the abdomen behind the bladder and became lost in the pelvic floor. The vaginal tract did not appear to be hollow at any part. Behind and below the uterus on either side lay a perfectly formed Fallopian tube; attached to each at its free end was a hydatid of Moegegin. There was a fine fibrous band passing from the uterus below the attachment of the Fallopian tubes to the region usually occupied by the ovaries. These bodies (proved to be testes) lay horizontally and were attached to the broad ligaments by mesentery. They were of the normal size for a boy of fourteen years, but devoid of epididymus or of vas deferens. In shape they were ovoid, the surfaces being shiny, smooth and clear white, except for a few areas of a light brown tint apparently due to fat. From the lower part of each testis a sheaf of large veins ran up into the abdomen. The mobility of the whole sheet of tissue containing the organs was remarkable and excision of the whole area would have been easy, but removal of the uterus and tubes alone would have been difficult. Reposition of the testis on the left side might have been the correct thing to do, but separation of the blood supply could not be insured. The question of treatment presented considerable difficulty but eventually it was decided to close the opening in the sac and return the whole to the abdomen; this was very easily done and the usual radical cure for hernia performed. The boy made an uneventful recovery. A portion of each testis was excised and sent for microscopical examination; the report states that both are testes with some excess of fibrous tissue

A. PELLEGRINI(2) reports the discovery of a uterus with two tubes and two testicles in the hernial sac (right inguinal hernia) of a child having normal external male genitals. The patient was an otherwise well-developed child of twenty-six months. Instead of the ovaries, there were two testicles, the diagnosis of which could be confirmed histologically. The treatment consisted in the extirpation of the uterus and "adnexa" followed by radical operation of the hernia, according to Banin. The patient made a complete and unin terrupted recovery. The rarity of this observation, from the teratological point of view, is emphasized by the author, who states that Fantine in 1912, in commenting upon 4580 operations for hernia, briefly refers to a case of uterus and tube in a right inguinal scrotal hernia in a boy of eighteen years with a left ectopic testicle; this case will be published in detail later. Elsewhere in the literature the

author was unable to find any cases similar to his own observation in which the perineal sac contained the uterus with both tubes and two well-developed testicles, the external male genital organs being well developed. Although rare, however, the case is probably not unique.

At a meeting of the British Medical Association in London, 1895, the external organs of a child were shown who died after an operation for inguinal hernia. There was a normal bladder with prostate gland. Projecting backward were a vagina, uterus and broad ligaments, round ligaments and Fallopian tubes, with testes in the position of the ovaries.

UTERUS IN INGUINAL HERNIA IN MAN.

Brindeau's(3) patient was a virile man of thirty-five, apparently normal except for inguinal hernia. The sac contained a uterus of normal adult size, with both tubes, and on drawing them out both testicles came with them. The danger of injuring the testicles was too great to risk removing the uterus, so the small testicle was resected and the uterus was utilized to block the large inguinal canal, suturing it to the ring.

Brindeau found eighteen similar cases recorded in Neugebauer's book on hermaphroditism and gives a brief summary of each. A few of the men had families. In 25 per cent. of the cases the uterus was double. The testicles were rarely normal. In a few cases the uterus was continuous with a vagina which opened into the urethra. It is generally better to remove the uterus at the herniotomy. His compilation includes Webster's two cases.

Endocrine Glands and Their Relation to Sex Aberrations.—There is an abundance of evidence both experimental and clinical which tends to show that the proper development of the sex glands and the normal sex-ensemble are dependent on the normal activity of the endocrine system. The sex glands and the adrenal cortex are developed from the Wolffian ridge, whereas the medulla is of neuro-ectodermal origin, as are also the sympathetic ganglia. During intrauterine life it is about equal in size to the kidney. This is due to an enlargement of the inner portion of the cortex, "the so-called fetal cortex," which begins to degenerate at or soon after birth. The medullary portion of the gland produces adrenalin; the cortical area is considered to be the source of a hormone that influences growth, nutrition and especially the reproductive organs (Barker).

Clinical and pathological evidence demonstrates the remarkable effects that lesions of the adrenal cortex exert on the various factors constituting sex (Quimby).

We have gained much knowledge of the whole subject by the ar-

ticles of Hofstatter, Lounois, Pinard, Bulloch, Sequeira, Gallais, Glynn, and Apert.

The clinical manifestations of disturbed functions of the adrenal cortex vary according to the age at which the disturbance arises. Apert makes five groups: (1) cases in which the disturbance occurred in embryonic life, and is associated with a greater or less degree of hermaphroditism; (2) cases with normal sex organs but with too early and profuse development of bodily hair (hypertrichosis); (3) precocious puberty, overdevelopment of hair and fat, but without trace of hermaphroditism; (4) after puberty the menses disappear, the bodily fat increases, as does the hairsutes. Later cases showing loss of hair and overgrowth of fat at the time of the menopause. Glenn points out that tumors of the adrenal cortex in children are almost invariably accompanied by sex abnormalities. This is also true when occurring in adult women before the menopause, and in adult males they are never so accompanied.

The sexual changes seen in acromegaly and after experimental interference with the pituitary body (Crone, Cushing and Hormans) furnish evidence that this gland also exerts an action over some of the sexual characteristics. It may, therefore, be supposed that there exists some interrelation between the pituitary body and the adrenal cortex, though at present the evidence of such is largely speculative (Quimby).

The subject of hermaphroditism is one of great interest and a large literature has grown up in connection with it. There is, however, a great want of accuracy in the ideas of many of us on the subject. Hart(4) asks the question "What do we really mean when we speak of male and female sex?" The only criterion of sex is the nature of the sex glands. In the male we have the testis containing sperm cells which ultimately become spermatozoa; in the female, an ovary containing an ova. The presence of either ova or spermatozoa in a sex gland is characteristic and definitely settles the question. The secondary sexual characteristics are well-developed mammæ.

It is evident from the description of my case that we are dealing with a case of a typical male sex-ensemble. Inasmuch as the sex of an individual is determined by the nature of the gonad, regardless of the presence of abnormalities, either of other parts of the genital system, or of the secondary sexual characteristics of the body as a whole. Consequently this patient is of the male sex as the gonad attached to the broad ligament proved histologically to be a testicle. The patient, therefore, belongs to the class of male "pseudo-hermaphroditism" of the internal type.

The external genitalia show no deviation from the normal male type except that the scrotum did not contain testes. There is little change in the secondary characteristics from the normal male. The voice, the hair on the face and abdominal and mental processes are all of the male type.

Negebauer (5) in going over 2000 case reports of pseudo-hermaphrodites found that those bearing the male gonad are about ten times as common as those bearing the female.

REFERENCES.

1. Braithwaite and Craig. *British Med. Journal*, July 25, 1914, p. 176.

2. Pellegrini. Utero colle due trombe e due testicoli nel sacco erinarin dium soggetto con genitali esterin maschili normalmenti conformati. *Gynecology*, vol. x, 5, 1913, p. 135.

3. Brindeau. Uterus and Tubes Found in Inguinal Hernia in Man, p. 150. *Archives Mens. d'Obstetrique et de Gynecologie*, Paris, June, v, Nos. 4, 5 and 6, pp. 93–188.

4. Hart. *International Clinics*, vol. iv, 1915, p. 135.

5. Negebauer. Hermaphroditism beim Menschem. Leipzig, 1908; also *Jahrb. f. Sexuelle Zwischenstufen*, Bd. v.

ABSENCE OF MUSCULAR TONE AN IMPORTANT ETIOLOGICAL FACTOR IN POSTOPERATIVE ILEUS.

BY

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FOLLOWING intraperitoneal operations a certain amount of stasis in the intestinal canal occurs. It has been our custom to regard it as only a temporary paralysis, in the majority of instances caused by insult to the peritoneum incident to manipulation. The usual conception is that the paralysis, with the consequent distention, is due to a reflected action upon the intestines through the nerve cells in the plexuses of Auerbach and Meissner.

This discussion does not apply to cases where there is sepsis present. We all know how difficult it is to exclude the possibility of a peritonitis in some instances, but there can be no doubt that, occasionally, a case is observed where its absence is proven and yet the patient dies from paralytic ileus in spite of all known remedies. The unfortunate part about such an experience is that it may occur when least expected; that is, when the supposed active factors in its production have been absent. By this is meant severity of operation, necessitating an unusual amount of intraperitoneal trauma with the resultant shock of prolonged anesthesia. The comparative frequency with which it has occurred, as a complication of vaginal hysterectomy, is significant because there is perhaps less trauma and shock incident to the handling of intestines than in any other operation where the peritoneal cavity is invaded. We will have occasion to refer to the apparent association later.

The degree of intestinal distention following the ordinary elective abdominal operation depends somewhat upon certain factors incident to the methods of procedure. Careful preparation of the patient for operation, proper choice and method of anesthesia, gentleness and judicious postoperative care, render further discussion of this subject unnecessary in the average patient. Occasionally, however, in spite of these precautions, we are confronted by an ag-

gravated form of the above described condition when death ensues after the employment of every effort to relieve.

When the patient shows evidence of chronic fatigue with the poor tissue tone that follows chronic infection or long continued strain, there is always greater difficulty in dealing with this postoperative complication. It is the belief of the writer that in certain instances, where death occurs from so-called paralytic ileus, it is primarily due to lack of muscular strength in the walls of the stomach and intestine. This conclusion has been reached after careful observation of the various degrees of intestinal distention occurring in routine abdominal surgery. We find that the degree in the individual case depends largely upon the tissue tone of the individual previous to and the amount of exhaustion which occurs incident to the operative procedure. The amount of exhaustion or shock, as it is commonly called, also depends upon the extent of procedure and the character of anesthetic. In many instances it is an interesting index to the general tissue tone in an individual, but unfortunately its exhibition after operation has no value, except that it is a troublesome complication which causes no little alarm.

Keith(1) has recently called attention to the presence of nodal tissue in the bowel similar to that in which the heart beat takes its normal origin. This nodal tissue is in the shape of neuromuscular tissue and is interposed between the muscle fibers on the one hand and nerve fibers and nerve cells on the other. The relationship is so intimate that he finds it difficult to say often whether a certain intermediate branched cell is to be regarded as a muscle cell or as one of the cellular elements of the plexus. Keith regards the myenteric plexus as one of a composite texture composed of nerve cells, fine fibers and branching intermediate cells which appear to become continuous with processes of certain groups of muscle cells on one hand and ganglionic cells of the nerve fibers of the plexus on the other. He concludes that nodal tissue is located at various points along the course of the intestinal tract which acts as the pace-maker for that particular section. This is of interest because it suggests the very intimate relationship that exists between the muscular and nervous system, and the disturbance that may arise if either is below the normal in efficiency; as in the heart, a block may occur at any point where one rhythmical zone passes into the succeeding zone.

Bayliss and Starling(2) demonstrated the intrinsic beat of bowel muscle. The musculature of the whole intestinal tract has its pulse. There is no reason why it does not vary in tone and strength as does the heart and every other muscle.

Magnus demonstrated in a study of isolated pieces of intestine that the strips beat more actively when removed from a normally-fed animal than when removed from an animal that was not digesting. Experiments lead to the conclusion that the entire intestinal canal is supplied with extrinsic nerves which regulate the control of tone. It has also been proven that if the canal is entirely separated from the central nervous system, it will develop an independent tonic state and after a time resume its rhythmic movements, but it will regain its characteristic movements only as it recovers tone. Tonus is, therefore, fundamental. Tonic contraction and rhythmic peristalsis disappear where there is general bodily weakness and where the depleted central nervous system fails to deliver the necessary tonic impulses(3).

For some time we have been observing the muscular tone of the intestinal canal both during and following abdominal operations. This study has been made in connection with one of tissue tone in general, with particular attention to heart muscle, and has led to the conclusion that postoperative distention will vary in direct proportion to the strength and tone of the muscular system. When careful study shows marked absence of tone before operation, and when inspection reveals a large dilated colon with marked absence of muscular tissue, we know that the patient will suffer more or less discomfort from this complication after operation, the degree depending upon the amount of strength remaining when the stress and shock of the operative procedure become effective.

In the study of a patient presenting the evidence of chronic fatigue with the above-mentioned handicap, some consideration should be given to the possibility of this complication for, in many instances, while it may not prove serious, yet it undoubtedly adds much to the risk and is an additional worry to the surgeon in his postoperative care of the patient.

We have called attention in a previous paper to the significance that should be attached to careful study of the heart muscle in some cases of prolapse of the uterus. Careful observation will soon demonstrate to any operator that in this type of case abdominal distention is common and oftentimes quite troublesome. Study of our cases shows that it is not only failure of the cardiac muscle to withstand the stress, but in some instances there is exhaustion of the muscular structure of the stomach and intestines to such a degree that death ensues from what has been termed paralytic ileus. Reports in literature of death from this cause following simple procedures for the relief of uterine prolapse lead to the belief that it is due

rather to absence of muscular strength than to some obscure effect upon the sympathetic nerve centers.

It is our custom to look with suspicion upon every case of prolapse of the uterus which develops rather suddenly: that is, when the principal predisposing factors have been present for a long time. This means oftentimes the addition of another factor, viz., sudden weakening of the muscular and ligamentous supports dependent upon some constitutional change in which the tissue weakness is a general one. Careful analysis of this predisposing cause may reveal widespread weakness of all tissues, and unless this condition is recognized, the resistance of the patient may be greatly overestimated.

While no instrument of precision, which will enable us to measure muscular tone, has been discovered, we believe that much may be learned from a correct study of the pulse pressure, where there is widespread muscular weakness. It is necessarily present in the cardiovascular system, and while we have been slow to grasp it, there can be no doubt that the careful study of blood pressure enables us to measure the strength of the heart muscle with much greater accuracy than ever before. Observation along this line leads us to believe that the great majority of cases under discussion show the same relative weakness in the muscles of the intestinal tract that is found in the heart and blood-vessels. In all patients, careful investigation of the blood pressure is made upon admission to the hospital. Operation is either refused or deferred in every patient where there is a pronounced fall in the pulse pressure after exercise. We have learned that this is the best index to vital resistance, and if operation is undertaken in a patient showing a marked fall in the pulse pressure, after a brisk walk or vigorous use of the dumb bells, the greatest care is given to the selection of the anesthetic, extent and duration of the operation. A patient thus handicapped will stand but little stress and exhaustion soon follows a short drive under any form of anesthesia. Two years ago we met with an experience in a patient who showed plain evidence of the relative strength of the heart and intestinal musculature, had we been able to grasp it. The loss of the patient was a great shock, but it awakened a keener interest in this subject and has led to more careful observation and study of every patient where there is any evidence of such weakness. A brief report of the case may be of interest.

Mrs. L. B., aged forty-eight, admitted to St. Francis Hospital, November 6, 1914. Diagnosis: Laceration of the perineum, cystocele, chronic endocervicitis, and prolapse of the uterus. This patient, aside from an attack of typhoid fever at the age of twenty-five, gave a

history of perfect health until three months before admission. At this time she first noticed the uterus coming out of the vagina and since that time has not been feeling well in a general way. She has complained of being tired and unable to withstand fatigue. She has had some shortness of breath on exertion. Patient appears in perfect health, well nourished and color unusually good. Physical examination reveals slight irregularity of the pulse. For this reason, she was placed in bed and kept there for a number of days, at the end of which time the pulse seemed perfectly regular, and while the heart sounds seemed somewhat distant they were perfectly clear. On November 14, her condition seemed very good, and it was decided that there would be no unusual risk in operating. The operation consisted of the repair of the cervix, cystocele and rectocele, shortening of the round ligaments, a procedure unaccompanied, as a rule, by any great amount of shock. It was noted at the time of operation that the tissues were unusually soft and friable. Ether anesthesia. Patient was unable to void after operation, and there began on the following day persistent distention of the intestines, which was accompanied by vomiting. Gastric lavage afforded relief for a few hours, as did the use of pituitrin and the repetition of enemas. This condition persisted for three days when, owing to a possible doubt as to the presence of some mechanical obstruction due to the operation, the abdomen was again opened. No mechanical obstruction was found, nor was there any evidence of peritonitis. The intestines were distended throughout, and while an enterostomy was done 4 inches from the ileocecal valve, the distention continued without relief. The patient died two days later from paralysis of the entire intestinal tract.

There seemed no doubt in this patient that death was due to lack of horsepower, and that it was located not only in the cardiovascular system, but in the unstriped muscular fibers of the gastrointestinal tract. A case of this kind supports the arguments advanced, that the prolapse was an important index and was a danger signal, which, if properly appreciated, might have prevented a surgical death.

A keen appreciation of this phase of the subject, taken in connection with the general summary of the findings in a given patient, will lead to careful preparation of the patient for operation, and will influence in many ways the method of procedure at the time of operation. Fewer patients of this type will be operated upon without a long period of rest in bed preparatory to any severe operative procedure. Much greater care will be exercised in the type of anesthetic. Local or spinal anesthesia will be employed more frequently because by these methods energy will be conserved. The strength of the patient will serve as a gauge for the extent of the procedure. Multiple operations will be avoided unless absolutely necessary. In many instances, unless the tone of the individual can be raised to a point where the resistance is equal to the strain, operation will be withheld and the serious risk of a fatality avoided. Prolonged inhalation anesthesia will be given with respect for the kind and method of administration. If ether, it will be finally learned that

much better results will be obtained by giving ether vapor or by the closed method. Many of the advantages of nitrous oxide are due to rebreathing rather than to the virtue of the nitrous oxide itself. We find that by subjecting this type of case to prolonged rest, open air with general massage and good food, that operation is followed by almost no postoperative distention. It is our belief that when a patient is given ether he is subjected to the same test, and that the effect is similar to that of a Marathon race. At the end there is exhaustion, and in certain patients the reserve strength is not sufficient to withstand the test.

The writer has had two fatal results from paralytic ileus. A study of these cases and observations upon patients where there has been severe distention following abdominal operations, has led to the belief that the condition is due in some cases to the direct effect of exhaustion over weakened muscular tissue rather than to some reflected action through the sympathetic nervous system.

We are fully aware that there is nothing new in this conclusion, and that the individual resistance of patients is fully appreciated by surgeons at the present time. We desire to emphasize the point that the mortality rate in elective surgery in the practice of a given surgeon represents his ability to appreciate these principles. While experience may bring a perfected judgment which grasps these various danger signals almost intuitively, we must admit that occasionally a patient springs a painful surprise after operation due to some condition that should have been recognized long before.

REFERENCES.

1. *The Lancet*, Aug. 21, 1915.
2. *Jour. of Physiology*, 1899, vol. xxiv, p. 99.
3. Cannon. *Archives of Internal Medicine*, vol. viii, Oct., 1911.

DISCUSSION.

DR. GORDON K. DICKINSON, Jersey City.—I wrote a paper last year, but it did not have the dignified title Dr. Huggins has given to his. I called mine "Gas Pains" because that is the term which the interne and the young man commonly use, and I wanted my paper to go to them.

All those who have written on the scientific aspect of the subject and have rearched into the cause of it and explained it have not given as good an opinion or explained it so well as Patterson, who advances the carbonic acid theory, or, better, the hypothesis that when you open the abdomen the carbonic acid is exhaled from the intestinal surface. Even if you put on moist gauze pads, it is exhaled in quantity and as the carbonic acid is a hormone unstriated muscle fiber you produce paresis of that part of the gut exposed;

consequently those who do not eviscerate and are instrumental surgeons, and those who avoid exposure of the intestines and manipulation, adding as little traumatism to evaporation as possible, are the ones who have less gas pains.

Working on that idea I carried it out after writing my paper, and as a result my internes are seldom called out at night to the bedside of patients to relieve gas pains. So I think the carbonic acid thought is a good one.

CHRONIC INTESTINAL STASIS—SOME CASE REPORTS. SERIES I.

BY

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(With seven illustrations.)

RIGHTLY the profession of medicine is slow to accept any new theory concerning disease or method of treatment. Scientific skepticism is justly regarded as a safeguard to the receipt of knowledge. Initial velocity is not sufficient to establish an hypothesis as fact.

Chronic intestinal stasis, or what the writer has often termed defective human plumbing, is increasingly being accepted as one of the fundamental causes of disease. Gradually the profession is coming to consider the condition as an entity, with far-reaching results. Many of those to whom stasis and constipation were at one time synonymous are broadening their viewpoint and learning that there may be residual intestinal content doing damage to the entire organism, regardless of whether there be activity of the lower bowel or not. This is evidenced by the fact that some of the worst cases of stasis occur in those with diarrhea.

Unfortunately, in the minds of many of the profession (happily their number seems rapidly diminishing), intestinal stasis has been thought to indicate only one kind of treatment—the removal of a large portion of the intestine with its consequent extreme surgical risk.

Those who have given thoughtful attention to the teachings of Lane and others are recognizing the truth of the oft-repeated statement that the vast majority of all cases of chronic intestinal stasis belong to the physician, through whose prompt and proper care the necessity of seeking ultimate relief at the hands of the surgeon will be obviated. Between this overwhelmingly large group and the relatively small number of neglected patients (those late in the disease, or previously treated by improper or inadequate surgery) who must have part of their plumbing removed in order to attain

comparative health and not drift into chronic invalidism with attendant complications which may terminate life, there remains a mid-group. In these cases a careful application of conservative surgery to the abdomen, according to the principles of the mechanics of the intestinal canal, returns the patient to the first group where, with medical care and reasonable attention to hygiene and dietetics, he can be restored to health and strength.

The writer, who has been for many years a close student of body plumbing, has published from time to time articles covering various phases of the subject of chronic intestinal stasis. The accompanying photographs have been previously utilized in this connection. It is his purpose in this and a number of subsequent papers to report succinctly a series of case histories illustrative of various types of stasis treated surgically and, though brief, these will comprise the essentials in such manner as to present a sufficient groundwork upon which to base conclusions. "Evidence is and must be the test of truth;" as it is only by weighing the evidence in relation to methods of treatment that medical progress is possible, it is hoped that the following case reports which give actual results—good, bad and indifferent—may serve to facilitate this end.

CHRONIC INTESTINAL STASIS; OVARIAN CYST; UTERINE DISPLACEMENT.

CASE I.—E. J.; female aet. fifty-one; single.

Previous History.—For fifteen years patient had been suffering from marked constipation; abdominal discomfort; extreme exhaustion; headache. Had undergone previous operation for removal of fibroid tumor and hemorrhoids, with no relief of the above symptoms. When the patient was first seen by me in the summer of 1902 she was practically an invalid.

Clinical Diagnosis.—Chronic intestinal stasis; ovarian cyst; uterine displacement.

Operation, October, 1902, at Alston's Private Hospital, New York City. *Findings:* Uterus bound tightly to the rectum; small ovarian cyst present; also a mass of adhesions causing colonic and ileal stasis.

Treatment.—Uterus sutured forward; cyst removed; numerous adhesions relieved. Raw surfaces covered; stasis apparently corrected. Uneventful recovery.

Status Præsens.—Examination August, 1916; slight constipation at times; no abdominal discomfort; no headache. Seemingly perfectly well. Patient states she has been teaching regularly since Jan., 1903.

CHRONIC INTESTINAL STASIS; UTERINE DISPLACEMENT.

CASE II.—L. T., female, aet. forty-two, single.

Previous History.—Had been suffering from epigastric and abdominal pain; marked constipation; large amount of gas; headache; dysmenorrhea. Was under medical treatment during the summer of 1901, and again during the summer of 1902; at this time a nurse was in attendance for seven weeks; loss of over 30 pounds in two and one-half years. General condition of the patient was so extreme when seen by me early in the fall of 1902 that rectal feeding had to be resorted to in order to strengthen the patient sufficiently to withstand surgical treatment.

Clinical Diagnosis.—Chronic intestinal stasis; uterine displacement.

Operation, October, 1902, at Alston's Private Hospital, New York City. *Findings:* Uterus retroverted; numerous adhesions; the enlarged, chronically inflamed appendix was twisted upon itself in two places, and in the center of a mass of old inflammatory tissue causing colonic and ileal stasis; ovaries normal, except for congestion.

Treatment.—Adhesions separated; appendix removed; cecum plicated and an ileopelvic band corrected; all inflammatory tissue was removed and raw surfaces covered; uterus anchored in its proper position. Uneventful recovery.

Status Præsens.—Examination August, 1916. Other than occasional constipation, the patient is in excellent condition; weighs 150 pounds; looks the picture of perfect health. Patient states she has been teaching regularly since Jan., 1903.

CHRONIC INTESTINAL STASIS; OVARIAN CYST.

CASE III.—M. H., female, aet. forty-three, single.

Previous History.—Never strong; for eight years previously had been suffering from marked constipation; abdominal discomfort; emaciation; headache; considerable dysmenorrhea. Skin icteric, almost alarmingly so. Had been treated for profound anemia. No previous operation.

Clinical Diagnosis.—Chronic intestinal stasis; ovarian cyst.

Operation, October 12, 1903, at Alston's Private Hospital, New York City. *Findings:* There was an ovarian cyst the size of a six months' pregnancy which had grown to the bowel; marked colonic stasis; many adhesions.

Treatment.—The uterus, ovaries and appendix were removed; adhesions relieved; stasis apparently corrected.

Status Præsens.—Examined August, 1916. Constipation at times which is readily relieved by bran; otherwise patient has had no symptoms since the operation. Has been teaching continuously for the past twelve years.

CHRONIC INTESTINAL STASIS; CARCINOMA OF THE TRANSVERSE COLON AND GREAT OMENTUM; ENLARGED GLANDS IN THE MESOCOLON; COLECTOMY; SHORT-CIRCUIT.

CASE IV.—W. J., male, aet. forty-seven, married, policeman. Referred to me by Dr. Wm. VanValzah Hayes, New York, and Dr. W. B. Thompson, Brooklyn.

Previous History.—Had been suffering for years from chronic constipation. On December 25, 1908, immediately after eating a hearty dinner, patient was seized with severe abdominal pain. Medical treatment for several weeks with no relief; then referred to me. No previous laparotomies.

Clinical Diagnosis.—Chronic intestinal stasis; tumor mass in the region of the transverse colon, probably carcinoma; obstruction.

Operation, January 22, 1909, at the New York Polyclinic Hospital. *Findings:* Advanced cancer of the transverse colon involving the great omentum, with almost complete obstruction; glands in the transverse mesocolon much enlarged, some extending up along the large vessels behind the stomach to the diaphragm; along the ascending and transverse colon, including the hepatic flexure, there were many bands of obstruction, the malignancy having apparently developed at the place where the stasis was most marked; there was a typical Lane's kink of the ileum, so that the gut was larger proximally than it was distally to that point; at one point in the greater curvature of the stomach there was evidence of malignant thickening of the peritoneal coat.

Treatment.—The thickened area of the greater curvature of the stomach, most of the ascending colon and all of the transverse colon, together with the gastrocolic omentum, were removed; the entire mesocolon of the portion of gut removed was excised close to the posterior abdominal wall; anastomosis was made between the cecum and the pelvic colon below the last kink. Uneventful recovery; patient returned to work three months after operation.

Pathological Findings.—Adenocarcinoma of the transverse colon, and glands.

Status Præsens.—July 12, 1916, patient reports by letter of this date that he has no symptoms whatever; is seemingly perfectly well, and has been working continuously since April, 1909.

CHRONIC INTESTINAL STASIS; SHORT-CIRCUIT.

CASE V.—S. C., male, aet. thirty-three, tailor.

Previous History.—Had been suffering from abdominal discomfort; headache; nausea; loss of strength; nervousness; depression; stained skin; constipation so marked as to be almost obstipation; often the most active cathartics would not move the bowels.

Clinical Diagnosis.—Chronic intestinal stasis.

Operation, May 5, 1911, at the New York Polyclinic Hospital. *Findings:* Numerous adhesions all about the ascending and descending colon; the sigmoid was folded upon itself forming almost a

volvulus; the hepatic and splenic flexures encased in bands. Marked Lane's kink.

Treatment.—Appendix removed; ileopelvic band corrected as far as possible, cutting transversely and sewing up longitudinally. Other bands corrected. Uneventful recovery.

Subsequent History.—Improvement in constipation immediately following operation with some relief of symptoms; after several months return of symptoms as previously; skin discolored; abdominal discomfort; headache; nervousness; depression; extreme constipation. At times patient was compelled to take eight compound cathartic pills in twenty-four hours, in addition to oil enemas, to obtain any movement of the bowels.

Second Operation, January 23, 1912, at New York Polyclinic Hospital. *Findings:* Numerous adhesions with dropping of colon; there was a sigmoid loop forming a diverticulum attached to the mesial aspect of the descending and transverse colons.

Treatment.—Typical Lane short-circuit operation. Uneventful recovery. Improvement of all symptoms; slight looseness of bowels which, with moderate care, became normal in a few weeks. Remarkable change in color of skin and in mental attitude.

Status Præsens.—July 11, 1916, patient reports by letter of this date that he has been eating three good meals a day; bowels are moving well without cathartics; that he has been at work regularly since three months after the second operation; and that he is "thoroughly restored to health and strength."

Remarks.—It is important to note here that the attempt to place this patient in the midgroup cases—that is, with those cases requiring conservative surgery—proved futile. Had the case been classified with the end group, where it properly belonged, and the radical operation performed in the first instance, the patient would have avoided one operation and much needless suffering. It illustrates an error in being too conservative.

CHRONIC INTESTINAL STASIS; ADHESION OF GREAT OMENTUM TO CECUM; UTERINE DISPLACEMENT.

CASE VI.*—T. M., female, aet. fifty, married, one child. Referred to me by Dr. A. LaMonte, Carmel, New York.

Previous History.—For many years had been suffering from pains in the back and lower extremities; constipation; abdominal discomfort; frequent attacks of so-called acute indigestion; vertigo; nervousness; darkly colored skin; considerable loss of flesh and strength. Medical treatment from time to time with very litle improvetment. No previous laparotomies.

Clinical Diagnosis.—Chronic intestinal stasis; uterine displacement.

Operation, June 11, 1912, at Alston's Private Hospital, New York City. *Findings:* Uterus retroverted; chronically inflamed appendix

* Case not previously reported. Illustration appeared in "A Contribution to the Study of Chronic Intestinal Stasis," *Medical Record*, September 27, 1913.

with marked perityphlitis; appendix firmly adherent to the cecum throughout its entire length; many bands about the cecum and terminal ileum; bands of great omentum firmly adherent to the meso-appendix drawing the stomach downward and to the right; marked ileal stasis; dilation of duodenum and stomach.

Treatment.—Ventral fixation of uterus; removal of appendix; constricting bands severed transversely and sewed up longitudinally. Uneventful recovery. On leaving the hospital a Lane-Curtis belt was prescribed, with instructions to adjust it while lying down, with the organs pushed toward the diaphragm. The use of Russian oil was urged.

Subsequent History.—May 12, 1915, patient returned complaining of some pain in the neighborhood of the gall-bladder. Examination revealed a slight clogging of the hepatic flexure. Patient had discontinued the use of Russian oil some time previously; this was

FIG. 1.—Case VI. Inflammatory stasis. T. M.; Band of omentum, two inches wide, firmly adherent to meso-appendix, drawing stomach downward and to right; appendix, throughout its entire length, firmly adherent to cecum.

again ordered. Otherwise, conditions good; there had been a gain in weight of 13 pounds.

Status Præsens.—July 15, 1916, patient reports by letter of this date that she is able to do all her housework and is feeling perfectly well, except for slight occasional "rheumatic pains" in the ankles; since operation there has been a gain in weight of fifteen pounds.

Remarks.—It is important to note in this instance that, in contrast to Case V, conservative surgery has thus far proved of great benefit to this patient. The midgroup classification for this case has apparently been correct. To me the greatest difficulty in connection with cases of chronic intestinal stasis is their proper classification so that a second operation may be avoided. Especially in this field, which remains largely to be worked out, are we confronted with the ever-present dilemma of being too radical on the one hand and too conservative on the other.

CHRONIC INTESTINAL STASIS; PERFORATED ULCER OF THE DUODENUM JUST BEYOND THE PYLORUS, WITH INFLAMMATORY DIVERTICULUM; MARKED LANE'S KINK.

CASE VII.*—C. C., male, aet. forty-seven, widower. Referred to me by Dr. Wm. VanValzah Hayes.

Previous History.—For three years had been suffering from attacks of nausea and vomiting which were becoming increasingly frequent; occasional headache; constipation; large amount of gas; pain in epigastrium, also across upper abdomen (above umbilicus) and back, more particularly four or five hours after eating; loss of considerable weight and strength.

Clinical Diagnosis.—Chronic intestinal stasis; ulcer of the duodenum; Lane's kink.

Operation, January 25, 1913, at New York Polyclinic Hospital. *Findings:* A small indurated mass in the duodenum just beyond the pylorus; the duodenum was kinked by a firm adhesion to the neck of the gall-bladder, which was free from stones or evidence of cholecystitis; behind the pylorus were large glands and indurated tissue running up behind the liver; there was a small fibroid on the anterior surface of the right lobe of the liver; a Lane's kink was found tightly fastening the ileum to the pelvic wall at a point about four inches from the cecum.

Treatment.—Posterior gastroenterostomy, 2½ inch opening; edges of the separated mesentery were approximated and stitched into place along the gastroenterostomy opening; a normal appendix was removed in order to give more ready access to the Lane's band which was severed and the edges of the peritoneum drawn together; the small fibroid of the liver was excised and the liver sutured. Uneventful recovery.

Status Præsens.—July 15, 1916; patient reports by letter of this date that he is very well; does a full day's work and barely knows he has a stomach; there has been a marked gain in weight and strength; he continues to take a small dose of Russian oil each night.

Remarks.—Figs. 2, 3, and 4, illustrating this case, indicate how futile a gastroenterostomy would have been, without proper attention to the other conditions present.

CHRONIC INTESTINAL STASIS; UTERINE DISPLACEMENT; PELVIC ADHESIONS.

CASE VIII.—J. D., female, aet. thirty-one, married. Referred to by Dr. W. H. Cantle, Mamaroneck, New York.

Previous History.—Three miscarriages. For three years patient had been suffering from headache; abdominal discomfort; large amount of gas; marked constipation; severe depression; loss of weight and strength; dysmenorrhea; local signs and symptoms of

* Case partially reported with illustrations in "Chronic Intestinal Stasis Surgically Considered," *New York Medical Journal*, January 24, 1914.

uterine displacement and pelvic congestion. Previous laparotomy in November, 1911; curettage, and uterus suspended. Symptoms increasingly severe after operation. When patient was first seen by me in June, 1912, her general condition was exceedingly poor.

Clinical Diagnosis.—Chronic intestinal stasis; uterine displacement; pelvic adhesions.

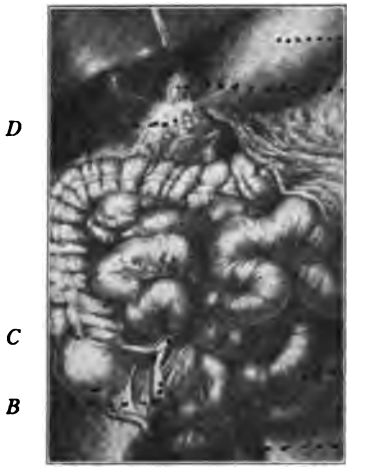

FIG. 2.—Case VII. C. C.: Patient practically in vertical position. *A*, Dilated ileum; *B*, terminal coil of ileum; *C*, Lane's kink; *D*, inflammatory mass around first portion of duodenum; *E*, diverticulum of duodenum; *F*, dilated stomach; *G*, pelvic colon.

FIG. 3.—Case VII. C. C.; Upper part of Fig. 2, enlarged, showing more detail.

Operation, June 12, 1912, at The Bethesda Hospital, White Plains, New York. *Findings:* Uterus retroverted; chronically inflamed appendix; enormous mass of adhesions, evidently the result of an infection, throughout pelvic cavity and posterior to uterus and pelvic colon; bands about cecum and terminal ileum causing marked ileal stasis.

Treatment.—Curettage; uterus sutured forward, modified Gilliam; appendectomy; bands about cecum and terminal ileum corrected. Condition of patient so extreme as to preclude further surgical interference. Uneventful recovery.

Subsequent History.—October 14, 1912, patient returned complaining of severe pain through left side over pelvic colon; general condition improved though not well; still some constipation; headache; no material gain in weight.

Second Operation, November 23, 1912, at Alston's Private Hospital, New York City. *Findings:* Multiple postinflammatory adhesions; pelvic colon twisted and firmly adherent to left broad ligament posteriorly and to the parietal peritoneum; for several feet, beginning 1½ feet from ileocecal valve, numerous areas of ileum adherent to parietal peritoneum; uterus, normal position.

Treatment.—Pelvic colon freed; all adhesions severed; raw surfaces covered; omentum sutured with plain catgut deeply down in

FIG. 4.—Case VII. C. C.; Lower part of Fig. 2, enlarged, showing more detail.

pelvis so as to cover raw surface of left broad ligament. Uninterrupted recovery.

Subsequent History.—April 4, 1913, patient returned still complaining of some pain in left side; periodical attacks of weakness accompanied by hyperidrosis; occasional headaches; general condition much improved; gain in weight and strength.

Third Operation, April 12, 1913, at Alston's Private Hospital, New York City. *Findings:* Numerous adhesions, though less in density and number than previously, situated along descending and upper part of pelvic colon.

Treatment.—Adhesions severed; raw surfaces covered. Oxygen administered intraabdominally; abdomen sutured full of oxygen gas. Uninterrupted recovery.

Status Præsens.—Examined April 25, 1916; gain of thirty-five pounds during past three years; no pain; no constipation; able to do all her own housework; seemingly in perfect health.

Remarks.—It is interesting to note in connection with this case that, in spite of the enormous quantity of adhesions and bands with their resultant symptoms of pain and stasis, only conservative surgery was at all times indicated. Of course, had the patient's condition been such as to warrant a more thorough surgical procedure in the first instance, one operation might have been avoided. However, in view of the subsequent history with the persistent symptom of pain in the left side necessitating a third operation, even this is doubtful. The administration of oxygen, intraabdominally, was a further effort to avoid re-formation of adhesions.

CHRONIC INTESTINAL STASIS; EXTENSIVE ILEOPELVIC BANDS.

CASE IX.*—C. C., female, aet. twenty-two. Referred to me by Dr. J. Douglas Nisbet, New York City.

Previous History.—For five years, since operation for nonunion of a broken collar-bone, had been suffering with so-called post-

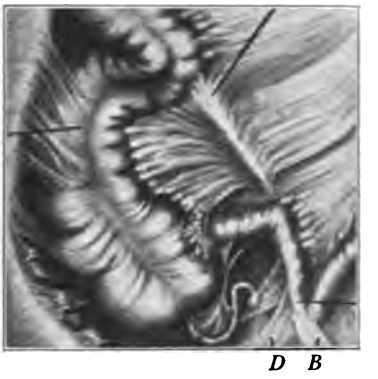

FIG. 5.—Case IX. C. C.; *A*, "Jackson's membrane;" *B*, multiple Lane's bands; *C*, Lane's kink; *D*, appendix caught in bands; *E*, thickened part of mesentery forming a strong band.

operative neurasthenia; frequent vomiting; vertigo; pain in back of neck; great depression at times; insomnia; constant nausea; loss of fifteen pounds in weight. Bowels regular. Prolonged medical treatment without satisfactory improvement. No previous laparotomies.

Clinical Diagnosis.—Chronic intestinal stasis.

Operation, March 12, 1913, at New York Polyclinic Hospital. *Findings:* Marked gastroptosis; liver and right kidney also displaced downward; evolutionary bands extending directly over pylorus to transverse colon; duodenum markedly dilated with a constricting band angulating its caliber just below the papilla of Vater and extending transversely across the duodenum down to the transverse

* Case not previously reported. Illustration appeared in "The Significance of Intraabdominal 'Bands,' 'Folds' and 'Veils,'" *Boston Medical and Surgical Journal,* February 19, 1914.

colon; the mobile cecum, acting as a bucket to retain fecal matter, pulled on the posterior wall of the abdomen, drawing over entire peritoneum, and extended into the true pelvis; bands in right iliac fossa partially holding the twisted cecum out of the pelvis; the ileum was connected to the anterior surface of the psoas muscle by a strong Lane's band across which lay the appendix, with a large gland nearby; there was also a strong, broad evolutionary band which extended from the ascending colon to the mesentery of the ileum, just above the Lane's band, about six inches from the cecum, angulating the ileum and ascending colon; sigmoid flexure of the colon, pelvic organs and gall-bladder explored and found normal.

Treatment.—All bands were corrected by bisecting transversely and suturing longitudinally, thus relieving angulations; appendix and nearby gland were removed; head of the colon was anchored to the posterolateral wall of the abdomen by sutures through the lateral muscle band. Uneventful recovery.

Status Præsens.—July 20, 1916, patient reports by letter of this date that she seems perfectly well; no abdominal soreness; eats and sleeps well; is in good spirits; gained of 10 pounds in weight; requires a little cascara, weekly, to keep bowels in good condition.

CHRONIC INTESTINAL STASIS.

CASE X.*—L. E., male, aet. thirty-eight., married, physician.

Previous History.—For eight years, since a fall from a horse, had been suffering with severe pains in stomach and abdominal discom-

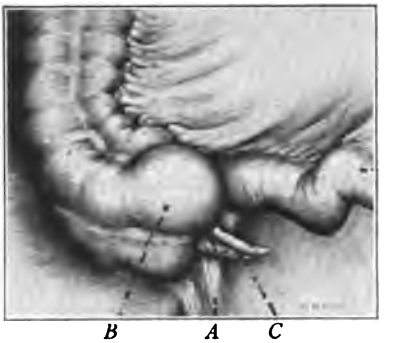

FIG. 6.—Case X. L. E.; *A*, Very strong ileopelvic (Lane's) band; *B*, mobile cecum; *C*, mesoappendix attached to Lane's band; *D*, dilated terminal ileum, with patulous ileocecal valve.

fort, more particularly after eating; large amount of gas in stomach and bowels; chronic constipation; depression. Considerable medical treatment from time to time with only little relief. No previous laparotomies.

* Case partially reported with illustrations in "Eleven Cases—Röntgenographic and Operative Findings," *American Journal of Röntgenology*, September, 1914.

Clinical Diagnosis.—Chronic intestinal stasis.

Operation, March 24, 1914, at New York Polyclinic Hospital. *Findings:* Healed ulcer of duodenum three-quarters of an inch beyond pyloric orifice; below this a number of bands extended from behind across duodenum, indenting it toward transverse colon and greater curvature of stomach; transverse colon much collapsed with hepatic flexure hanging downward almost to umbilicus, splenic flexure well supported; mobile cecum; posterior muscle band was anterior and below, forming an angle around a fixed point at the base of the appendix; the mid-point of the appendix, which was five inches long, represented a band extending into pelvis, around which mobile cecum rotated; patulous ileocecal valve; dilated terminal ileum; several adventitious bands about sigmoid; ileopelvic Lane's band with mesoappendix attached to it.

FIG. 7.—Case X. L. E.; *A*, Dilated duodenum; *B*, band of constriction across duodenum.

Treatment.—Appendix was removed and band from mesoappendix cut transversely and the raw surface turned in, fine linen thread dipped in paraffin being used for sutures; duodenal and other bands similarly corrected; the caput coli was sutured into normal position in the right flank, preventing rotation and descent into the pelvis; a stitch was taken directly at the junction of the caput coli and the ileum, slightly indenting the site of the valve; the adventitious bands of adhesions on the sigmoid colon were bisected one way and sutured the other, leaving a normal last kink in the sigmoid.

Subsequent History.—Immediately after the operation patient had a violent attack of vomiting, rupturing a few stitches in the wound which healed well later, but resulted in a hernia. Otherwise, recovery was uneventful.

Second Operation, June 5, 1916, at Alston's Private Hospital, New York City. Hernia corrected.

Status Præsens.—July 1, 1916, patient reports by letter of this date that he is feeling perfectly well; no aches or pains of any kind; eats everything; sleeps well; in good spirits; gain of 22 pounds in weight since operation; bowels fairly regular; takes a small dose of Russian oil occasionally and at times licorice powder at night.

DISCUSSION.

DR. CHARLES L. BONIFIELD, Cincinnati, Ohio.—We have with us to-day Professor Emerson, of Indianapolis, and I move that the privileges of the floor be extended to him to take part in this discussion.

Motion seconded and carried.

DR. CHARLES P. EMERSON, Indianapolis, Indiana.—I have been intensely interested in Dr. Bainbridge's contribution, and I certainly congratulate him on his results, because, speaking from the standpoint of an internist, those are the cases where we must have the assistance of the surgeon.

From the point of view of diagnosis, I would like to ask Dr. Bainbridge if "colonic stasis" is the essential factor in these cases? Cannot these cases be interpreted in some other way? Would it not be more correct to speak of them as cases of chronic (*e.g.*, streptococcic) colitis? You may remember how many of these cases the doctor has just reported in which there was also either chronic appendicitis or duodenal ulcer, certainly the results of infection. The reason I raise the question, for I have no very positive opinion, is this: certainly colonic stasis *per se* does not lead to bad results. I remember a young man who frequently went without a bowel movement for twenty days, and it seems that this was almost normal for him. His was a case of giant colon. He did not complain of the symptoms usually ascribed to colonic stasis, and there are not a few cases on record in which we have colonic stasis without these results. We are regarding with increasing respect the streptococcus group and recent reports show that chronic streptococcus (viridans) infections of the bowel wall may be important in the production of arthritis. It may be that I am only quibbling this morning, when I ask the question, can these cases just reported not be interpreted as a chronic infection of the bowel wall, leading to chronic changes in the muscularis, and this to chronic intestinal stasis and also to septicemia from the bowel wall? The treatment would in either case be the same so far as the abdomen is concerned, that is, extensive surgery, and I can indeed applaud Dr. Bainbridge when he says that the surgeon must do everything that has to be done if he expects results. But there is this difference. If we grant the point of view suggested, we certainly must, in addition to the intraabdominal operation should the case require this, pay in the future much more attention to the patient's nose, tonsils and teeth.

DR. E. GUSTAV ZINKE, Cincinnati, Ohio.—Permit me to ask Dr. Bainbridge a question. My position is that of Dr. Emerson and, therefore, I ask Dr. Bainbridge to explain, in closing the discussion, those cases in which constipation is very excessive.

When still a student in the medical college, a woman came to the clinic and when Professor Graham asked her of what she complained, she replied, "I have the diarrhea." He asked her how many times her bowels moved and she answered, "About two or three times a week." Professor Graham said to her, "Did I understand you to say you have diarrhea?" She answered, "Yes, doctor." Dr.

Graham looked amazed and said, "Will you please tell me how often your bowels move when you have no diarrhea." She promptly answered, "Once a month." This woman was sick when her bowels moved oftener than once a month.

There is a case on record of a French naval officer, who died at the age of fifty-two, whose bowels moved only from three to four times a year. Every time his bowels began to move he was given leave of absence for one month. When he died, postmortem showed that a short distance above the internal sphincter ani muscle the lumen of the bowel had contracted to the size of a pencil, and the descending colon measured nearly 32 inches in circumference. There are other instances of a similar character on record.

Will Dr. Bainbridge kindly explain the well being of these individuals who, in spite of the excessive constipation, lead a life of comparative comfort?

DR. JAMES E. DAVIS, Detroit.—I would like to ask Dr. Bainbridge how he arrived at his judgment of when it is necessary to rearrange the supports of the bowel? This, it seems to me, is a difficult problem to be determined in many instances.

I recall making a study two years ago of upward of 300 cases of the colon, on the dissecting table, and in about 50 per cent. of these cases the colon showed abnormalities. I am very much interested in knowing how Dr. Bainbridge proceeds when he opens the abdomen to determine just where and which bands should be released.

DR. CHARLES L. BONIFIELD, Cincinnati.—I rise to compliment Dr. Bainbridge on his very clear and thorough conception of the whole subject.

There is one element in the etiology of these cases that I want to emphasize, and that is healthy innervation of the intestines. I think every one, who has been doing gynecological surgery for fifteen or twenty years, has seen many cases where we open the abdomen purely for a pelvic condition, such as retroversion, prolapse of the ovaries, adhesions, and so on. We have examined these patients and found the stomach dilated and somewhat low, with more or less kinking of the intestines, and possibly a bad appendix, and by simply attending to the pelvic work, and removing the appendix, if necessary, these patients are put into a condition where they get well from medical treatment. In order to bring about a cure in these cases, these patients are to be put in a condition where the nervous mechanism can be so improved as to overcome the slight abnormality in the intestinal canal. I believe the nervous system has much to do with these cases.

DR. MAGNUS A. TATE, Cincinnati, Ohio.—In reference to the transplantation of fat taken from the leg, I would like to ask Dr. Bainbridge if there is not danger of necrosis taking place?

DR. BAINBRIDGE (closing the discussion).—In reply to Dr. Tate's question concerning the possible danger of necrosis following the implantation of fat, such a possibility is not to be forgotten, and it should be forestalled by the exercise of the utmost dexterity in the handling of the tissues. A thin layer of fat, from the thigh or else-

where, is removed, care being taken to prevent the slightest traumatism; this is placed in normal saline solution, and then transplanted. A piece of rubber tissue is put in the center for drainage. Fat has been transplanted by Binnie and others on tendons, on the hand, around the wrist; on the brain, as some of the German surgeons have done, to eliminate adhesions between brain and dura, and I have transplanted it numbers of times in the abdomen with excellent results.

Replying to Dr. Davis' question regarding the application of the abdominal supports, I would refer the doctor to an article on the "Operative Treatment of Chronic Intestinal Stasis," which appeared in the United States Naval Medical Bulletin, vol. ix, 1915, in which I have described in detail, with illustrations, the application of the supports, and have dealt with the various operative procedures employed in the treatment of these cases. The question of individual resistance and acquired immunity seem to play a part in explaining why some individuals are able to maintain a fair degree of health and activity despite a marked amount of stasis and retention of effete material. Some are evidently much more susceptible than others to autointoxication under these circumstances, just as, in the case of laboratory rabbits, there has been found a difference in susceptibility between white ones and black ones. Some of the bands found in connection with chronic intestinal stasis may be congenital, many are inflammatory, but it certainly seems that the evolutionary theory of origin fits in more nearly with the mechanical estimate of the matter, as emphasized by Lane. Any classification of these structures is necessarily more or less arbitrary.

Dr. Emerson has brought up an important matter in regard to the relationship between bacteriology and chronic intestinal stasis. This is emphasized by the fact that in cases of marked stasis a pure culture of colon bacillus may be obtained from the abdominal cavity, before the hollow organs are opened, that these organisms may be found in the urine, and that they may even be recovered from the laparotomy incision despite the utmost care in cases of delayed healing. Just what these organisms may have to do with the formation of these bands is a matter to be worked out.

TUBERCULOUS GLANDS OF THE MESENTERY.

BY

ARTHUR T. JONES, M. D.,

Providence, Rhode Island.

THE frequency with which we have found enlarged mesenteric glands during the past few years in cases that have presented surgical symptoms aroused my interest as to the character of this glandular enlargement, and whether or not all of these enlargements were of tubercular origin.

The following cases are interesting, as showing the types of this condition and some of the complications which we may expect to find accompanying the presence of enlarged mesenteric glands.

CASE I.—W. M., male, aged sixteen years. Operated upon March 7, 1913. Preoperative diagnosis: Intestinal obstruction. Upon opening abdomen free bloody fluid in belly. Band of omentum found adherent to calcareous gland in mesentery of small intestine constricting and obstructing a large amount of transverse colon and coil of one foot or more of ileum. Mesentery was studded with calcareous glands from size of a pea to small marble. Appendix inflamed to a degree in keeping with general inflammatory condition present. Appendix removed. Constricting bands were freed relieving the obstruction. Uneventful recovery.

Report of pathologist of one of the glands which was removed. "Calcified tuberculous lymph gland of mesentery."

CASE II.—B. M., female, aged forty-five years. Operation March 11, 1913. Diagnosis: Intestinal obstruction. At operation free, bloody serum in belly. Small intestine distended down to within 2½ inches of cecum; beyond this it was collapsed and at this point on the small intestine was a broad band of omentum, which was adherent to a calcareous mesenteric gland, and which completely constricted and obstructed the gut. Bands were cut, relieving the obstruction. Patient died March 15 of general peritonitis, which was marked at time of operation.

CASE III.—B. B., female, aged three years. Operation December 30, 1914. Intestinal obstruction. Patient *in extremis*. Operation matter of last resort. Glands in mesentery of small intestine large and hard, several being size of filberts. Two bands of omentum constricting intestine, one around the ileum at its juction

with cecum, another around loop of small intestine. Both bands apparently constricted gut almost completely. Patient died on table before operation could be completed.

CASE IV.—A. S., male, aged nineteen years. This case in light of previous experience was operated upon with a diagnosis of tubercular mesenteric glands. History: Mother and father well. Several other children well and strong. No history of tuberculosis in the family anywhere that parents know of. Patient always well and unusually rugged up to present illness.

Present illness dates back six months when he began "running down;" complained of weakness and has gradually lost weight. Bowels usually constipated; for past few weeks has been worse; passing blood with bowel movements at times and finally became so weak that he had to stop work seven months ago. He has had no indigestion, gas or stomach trouble during the past few weeks but has had attacks of diarrhea coming on as soon as he took food. Widal examination, negative. Afternoon elevation of temperature.

Examination shows fairly well nourished young man; face rather flushed; abdomen somewhat sensitive around navel. By rectum feeling of glandular enlargement in pelvis.

Operation January 16, 1915. Upon opening abdomen stomach found normal, excepting pyloric end rather deeply injected. Pylorus seemed slightly thickened, but no signs of gastric or duodenal ulcer. Examination of intestines shows glands all through the mesentery greatly enlarged and hard. Two large glands removed for microscopical examination. Appendix found size of little finger, thick and tense. It was removed. Incision closed. Uneventful recovery.

Pathological examination of glands. Microscopic examination shows evidences of hemorrhagic inflammation in glands. No tubercles found in either the appendix or glands. No areas of caseation. Diagnosis: Chronic appendicitis, hemorrhagic inflammation of glands.

NOTE: Grossly, glands resemble tubercular glands. Tubercular stains in tissue negative.

CASE V.—C. H., female, aged thirty years. Operated upon February 6, 1915. Upon opening abdomen a three months pregnant uterus was found. Is well over to patient's right side. Right ovary and tube normal, but at left horn of uterus tube and ovary absent. Latter found on left side of pelvis attached to broad ligament entirely separated from the uterus with peritoneal bands extending from ovary and tube down over brim of pelvis, and which go down to side of uterus at about the junction of cervix with body. The mesentery of the small intestine is studded with tuberculous gland size of filbert. Appendix large, was removed. Uneventful recovery. Patient did not miscarry. Pathological report not found.

CASE VI.—E. D., female, aged eleven years. Operation December 22, 1915. Subacute appendicitis. Appendix found long and injected. Removed. The mesentery of small and large intestine was studded with enlarged glands, one of which was removed from mesocolon for examination. Uneventful recovery.

Pathological report of gland. Microscopic examination. Gland

section shows a necrosis toward lumen and an increase of lymphoid cells. Appendix shows no evidence of tubercles. Diagnosis: Chronic inflammatory reaction in the mesenteric glands.

CASE VII.—G. S., male, aged fifty-four years. Operation February 4, 1916. Intestinal obstruction. At operation ileum found deeply injected and distended. Mesentery thick, infiltrated and studded with hard, small glands. Pelvic ileum matted together and adherent in pelvis. It was freed and brought up. Marked kinking found, two loops of gut being firmly adherent making complete obstruction, beyond which ileum is collapsed and normal. This condition was found about 10 inches from cecum. Mesentery so thick that could not bring up single loop of ileum, but necessitated three loops with the volvulus being delivered outside the abdomen. It was fastened to incision in lower angle, and above this the incision was closed. Condition diagnosed grossly as tuberculous peritonitis which was cause of volvulus. Patient died of pneumonia five days later.

CASE VIII.—R. W., female, aged five years. Seen in consultation March 10, 1916. History of acute appendicitis. Operation performed. Appendix found not grossly diseased, but mesentery at ileocecal juncture studded with ten or twelve enlarged glands, one of which was removed for examination.

Pathological report: Tuberculous mesenteric gland.

CASE IX.—H. T., male, aged twenty years. Operation September 15, 1916. Diagnosis: Acute appendicitis. Upon opening abdomen appendix found acutely inflamed, enlarged and bound down with peritoneal bands. Firm peritoneal bands constricting and holding down coil of ileum, making a definite obstruction, beyond which ileum is decidedly smaller in caliber and collapsed. Several glands in mesentery at ileocecal junction enlarged. Two coils of ileum adherent to mesentery making definite obstruction and which were freed. Further investigation showed glands studded all through mesentery of small intestine and not confined to ileocecal junction. Two glands were removed for examination.

Report of pathologist: Microscopical examination shows giant-cell formation to a slight extent, but an increase of lymphoid and plasma cells. No caseation present in any section. Definite attempt at tubercle formation in several sections. Diagnosis: Early tubercular process.

All of these cases presented surgical symptoms for which operation was performed, and at which the primary cause of trouble was found to be disease of the mesenteric glands.

A review of the literature shows that this condition has been recognized more particularly during the past five years, and the consensus of opinion is that a great majority of these cases are tuberculous in character.

Pathology.—Inflammation of the lymph glands is a common condition and is usually brought about by infective material or toxins

reaching them through the afferent lymphatics. The process may arise by extension of inflammation from the adjacent structures, more rarely it is a hematogenous infection. Lymphadenitis is invariably secondary to infection elsewhere. The glands nearest the point of entrance of the offending bacteria are generally affected, but those at some distance are quite commonly involved owing to the action of diffusable toxins. Acute lymphadenitis is simple or suppurative, the latter variety generally supervening upon the former. Suppurative lymphadenitis is due to infection with pyogenic organisms.

Microscopically the enlargement of the glands is found in the main to consist of a hyperplasia of the cellular elements as evidenced by nuclear division and increase in the number of cells. Not only are the lymph elements affected in this way, but the endothelial plates proliferate and are found in great numbers, often with several nuclei, more particularly in the lymph channels. This catarrh of the plates, as has been shown by Mallory, is a prominent feature in mesenteric glands and to some extent in others in typhoid fever.

Tuberculosis of the lymph glands in most cases is brought about by bacilli that reach them through afferent lymph vessels, more rarely from the blood stream. The glands generally affected are the cervical, peribronchial and mesenteric. In tuberculosis of the mesenteric glands the mucous membrane of the intestine may entirely escape. In some cases, possibly from secondary infection, the glands suppurate and may discharge their contents into the nearest cavity. Rupture into the vein or into the thoracic duct is the most potent of systemic miliary infection with tuberculosis. In long standing cases the glands become shrunken, more or less fibrosed, and may contain calcareous deposits.

Disease of the mesenteric glands may be either primary or secondary. If primary it is usually tuberculous. When secondarily involved, the glands may be tuberculous secondary to other tuberculous conditions, usually in the intestines themselves, or the glands may be secondarily enlarged from inflammation or septic processes elsewhere in the body.

We quite frequently find a few enlarged lymph-nodes in the mesentery at the ileocecal triangle in cases of acute or subacute appendicitis. In fact, the right lower quadrant of the abdomen is usually the location in which this condition is most frequently found. This accounts for the fact that many of these cases have been operated upon with the diagnosis of appendicitis or some acute intestinal condition which presented a decidedly surgical appear-

ance. Upon opening the abdomen possibly a rather harmless appendix is found and which is apparently not enough to account for symptoms. Further exploration in these cases reveals the mesentery studded with enlarged glands in various degrees of inflammation and varying in size from that of a pea to that of a filbert. In some cases we may find large retroperitoneal masses composed of several glands, the whole mass being from the size of an egg to that of an orange or even larger.

There are three reasons why the glands are most frequently found in the right lower quadrant:

1. The delay in the passage of food when it gets to the cecum.

2. The presence of organisms; they being much more numerous in the cecum than in the small intestine.

3. Presence of inflammation more frequent in this location.

Some cases have been proved tuberculous, and some are acute glandular inflammation associated with subacute infection of the appendx.

Lund, in writing of this condition in 1912, states that at that time he had seen about a dozen cases of tuberculous mesenteric glands with, or without, a chronic appendicitis. All his cases were in children, and he reports no cases of obstruction from bands adherent to inflamed glands, although he speaks of other cases in the literature of that time.

The diagnosis of this condition is usually not made before operation, as there are no distinctive symptoms due to the glandular enlargements *per se*. Symptoms are usually due to complications caused by the inflammation of the glands which are beginning to break down and in which nature, in trying to protect from a general infection, produces adhesions between omentum and the inflamed glands. Again, coils of intestine may be matted together in an effort to wall off the inflamed area, and we may find our obstruction due to this matting together of intestinal coils.

Physiology shows that if the mesenteric lymph nodes become diseased enough to block the entire flow of lymph, the protein and carbohydrate digestion and absorption will not be interfered with, but that at least 60 per cent. of the fat ingested will not be absorbed. The amount of interference with absorption of fat would naturally depend on the number, location of the diseased glands, and how frequently they block the lymph ducts and their numerous anastomoses. Hence the significance of fat in the stools of tuberculous children.

Experiments have shown that the protein and carbohydrates are

entirely taken up by the blood of the portal system, whereas the fats are absorbed by the lymphatics of the intestines. These mesenteric glands, as has been shown from cases reported, may subside or they may go on to calcareous degeneration or we may have caseation, secondary infection and breaking down of the glands in which case we may get a general tuberculous peritonitis, or we may have bands of omentum adherent to these suppurating glands which is nature's effort to wall off the suppurating focus. The bands may cause intestinal obstruction as they did in three of these cases reported. In one case the coils of intestines were adherent to inflamed glands and matted together causing obstruction.

The mesenteric glands are so frequently enlarged in children who present surgical symptoms that some writers have made the statement that tuberculous mesenteric glands are to be found in practically every child in which an abdominal operation is necessary. This statement would hardly hold, as we see many cases of intussusception in children in which there is no enlargement of mesenteric glands. It is, however, of undoubted frequency and many of these cases are probably of the bovine type of tuberculosis due to the fact that a great portion of a child's diet during its first two or three years is milk.

The bovine type seems to be much less harmful and not productive of symptoms, and probably accounts for the fact that the presence of enlarged glands in many cases is only discovered at autopsy; or it may be, as some writers hold, that these cases ultimately go on to complete recovery. Glands in adults are much more apt to be of tuberculous origin.

In many cases this enlargement of the glands undoubtedly precedes a condition of general tuberculous peritonitis, as illustrated by a case which Risley reports.

"Case of a boy, nine years old, with an acute belly of 48 hours, duration; temp. 101°, white cell count 9000. At operation the lower ileum was found adherent to the side of the ascending colon near the cecum and to a large ulcerated tuberculous gland in the mesentery. The peritoneum was smooth and not injected. Convalescence satisfactory, but slow until the 11th day when signs of further intestinal obstruction developed. Was again opened and a few fresh adhesions freed, and to the great surprise of the operator and his assistants, the whole peritoneum, both parietal and visceral, was found to be thickly studded with tubercles, several of which were excised and reported to be tuberculous. Convalescence from that time on was uneventful. Patient gained weight."

This case is of interest, as the tuberculous peritonitis developed following the first operation. If it is a fact that tuberculous peri-

tonitis follows this condition of enlarged glands, it would seem as if the opening of the abdomen might have some beneficial effect, as it does in those cases of tuberculous peritonitis; yet some writers claim that the admittance of air to the abdomen does not affect these early cases beneficially, as it does the cases of tuberculous peritonitis.

The treatment of this condition resolves itself into treatment of existing complications in most cases. In a case where the mesentery is studded with enlarged glands it would be an impossibility to remove all of them, but in a case where the only glandular enlargement is possibly at the ileocecal triangle, with only a few glands involved, it would be wise to remove these glands. As this condition is so frequently found in the right lower quadrant of the abdomen, and so often gives symptoms simulating appendicitis, it is well to keep in mind the possibility of this condition and at operation for appendicitis, in which we find the appendix not sufficiently diseased to account for symptoms, to look further and see if there are enlarged glands in the ileocecal triangle, or any obstruction in the small intestine due to inflamed mesenteric glands. The frequency with which we find this condition would argue against the small incision, or so-called gridiron incision, in cases of appendicitis and should make us particular in every case to investigate the ileum and be sure that it is free, and that there are no obstructions either from inflamed glands or peritoneal bands.

CONCLUSIONS.

1. Tuberculous mesenteric glands is often a primary disease of the true tuberculous type. The bovine type is undoubtedly present in many children without producing symptoms, the glands remaining quiescent, or having a tendency to subside.

2. It is impossible to make a correct diagnosis before operation, as a rule, unless there are palpable glands which may be felt through the abdominal wall, or by the finger in the rectum.

3. Tubercular mesenteric glands may be present without giving symptoms.

4. There are two clinical types.

(*a*) A slightly progressing one generally with palpable glands.

(*b*) An acute fulminating type most often simulating and impossible generally to differentiate from appendicitis.

5. Prognosis in subacute stage good without operation. In acute stage exploratory laparotomy should be done, but glands not removed unless definite indications either from adhesions, ulceration or size of mass producing pain or much obstruction.

6. Tuberculous glands of the mesentery may not present any symptoms until breaking down begins in the glands after which we

get symptoms of tuberculous peritonitis, intestinal obstruction, or symptoms simulating acute appendicitis.

7. In children and young adults with history of right-sided abdominal pain, with or without palpable masses, inflamed mesenteric glands should always be considered as a possibility.

REFERENCES.

Adami and Nichols, vol. ii, p. 215.
Parker. *Boston Med. and Surg. Jour.*, vol. clxvii, No. 26.
Newbolt. *Liverpool Med. Chir. Jour.*, 1910, p. 291.
Corner. *Trans. Med. Jour.*, London, vol. xxix, p. 402; *The Lancet*, Feb. 17, 1912, p. 426.
Corner and Brattle. *Surg. of Diseases of Appendix*, p. 270.
Lockwood. St. Bartholomew's Hos. Rep., vol. xlv, 1909.
Thiemann. *Archiv für kliniche Chirurgie*, Jan. 23, 1910.
Schlossmann. *Beiträge zur klinichen Chirurgie*, Tubingen, Apr., 1912, p. 241.
Mayfield. Abdom. Tuberculosis, pp. 173–192.
Talbot. *Amer. Jour. of Dis. of Children*, vol. i, No. 1, pp. 49–66.
Schram. *Amer. Jour. of Surg.*, vol. xxvi, No. 7, pp. 269–271.
Lund. *Boston Med. and Surg. Jour.*, Dec. 26, 1912, p. 167, No. 26. *Edinburgh Med. Jour.*, Feb., 1915, vol. xiv. *British Jour. of Children's Dis.*, London, July 11, No. 127, pp. 218–236.

DISCUSSION.

DR. HUGO O. PANTZER, Indianapolis.—Abdominal adenitis is scarcely mentioned in literature. Yet we may assume it to be present frequently as an attendant upon infection in the abdomen, as elsewhere in the body.

My attention was first emphatically called to this condition about fifteen years ago when I operated for a gangrenous cholecystitis following typhoid fever in a woman about fifty-five years of age. I found the abdomen full of bile. When I put my gauze sponge in the abdominal cavity I encountered several bodies. At first I thought they were gall-stones, but directly found that they were situated retroperitoneally and, hence, not such. I dug out several of them for examination, which the pathologist reported to be calcareous glands representing the last stages of an infectious disease. The history of the case, as investigated later, showed that the woman had pined and wasted a period of five years, between the ages of fourteen and nineteen, and then gradually resumed health. At the time of my operation her body was in good form. I take it most likely that she had had at the former period *tuberculosis of the abdomen* affecting also the retroperitoneal glands, which disease had come to spontaneous recovery.

Ileocecal adenitis, as attending upon the ordinary infectious appendicitis, is commonly present, though hardly ever recognized by the average operator. In a paper before the Pan-American Medical Congress at San Francisco last year, I named this condition, for the

purpose of emphasizing it, "ileocecal pharyngitis." The abdominal counterpart of glandular involvement closely resembles the cervical adenitis going with an acute throat disease.

Dr. Charles L. Bonifield, Cincinnati.—I recall operating on a child some eight or ten years ago under the mistaken diagnosis of appendicitis, in which the trouble was an acute involvement of all the mesenteric glands. I did not remove any for examination, but I have no doubt they were tubercular. I closed the abdomen, and had the child treated for tuberculosis elsewhere. I have not heard about her condition recently, but at the end of two years the child was apparently in perfect health.

Dr. E. Gustav Zinke, Cincinnati.—About twenty years ago I operated upon a woman for supposed multiple uterine fibroids. The tumors could be plainly felt through the abdominal wall. Bimanual examination gave the impression they were attached to the uterus. To my surprise, on opening the cavity, I found the tumors were really nothing but enormously enlarged mesenteric glands. There were six or seven of them. The abdomen was closed and in due time the woman was sent home. Not hearing from this patient for six months, I called on her and found her washing clothes over a wash-tub. Upon inquiry she said, "I am all right; I never felt better in my life." An examination showed that the "tumors" had almost entirely disappeared. She was again examined a year later and not a trace of the tumor could be felt.

Dr. Gordon K. Dickinson, Jersey City.—The spirochetes and the tubercle bacillus get into the system and stay there as long as a patient lives. We have two tubercular germs, the bovine and human. The bovine gets into the system with milk, that is, it gains access to the intestinal tube and gets into the mesenteric glands. The human tubercle bacillus gains entrance through the respiratory tract, goes through the lung, leaves a little scar, passes into the glands of the hilum of the lung and poverty and unhygienic conditions bring it out through a lowering of the resistance of the patient. The tubercle bacillus of the bovine type is not normal to the human body. The glands become inflamed and enlarge, but after a while this passes away, and the germ dies. The tubercle bacillus of the human type remains a lifetime. It affects the lymphatics and other structures of the body. Tuberculosis of the mesenteric glands is practically always of the bovine type and is generally innocuous. If it becomes secondarily infected with pyogenic germs, or if we have the human type of tubercle bacillus, we have a secondary infection. The researches of Ghon, of Prague, and Hamburger, of Vienna, on numerous autopsies showed these two types of tubercle bacilli.

Dr. Jones (closing).—I wish to thank the gentlemen for bringing out some interesting points in this discussion. If my paper is of any value, it is to emphasize the point that we do find this condition frequently in the right lower quadrant of the abdomen, particularly at the ileocecal junction. It is frequently the cause of ileus due to adhesions between the coils of ileum and inflamed glands. It has

made me careful in every case in which I have opened the abdomen for appendix trouble to follow along the ileum from the cecum to see if there are any adhesions, and therein perhaps I have done more good as I have found those bands of adhesions about which Dr. Bainbridge has been telling us.

Within the last two or three months, possibly six or seven cases have come under my observation in which, had we removed the appendix and that alone, we would not have removed all of the pathology, and we would not have relieved the symptoms of these patients. It is important to realize we have tuberculosis of the mesenteric glands as the cause of some of our symptoms, and we should not be satisfied merely to remove the appendix, but go beyond that, cut these bands, free the ileum, and relieve the cause of the intestinal stasis in many of these cases.

Dr. Keefe will remember a case we had a few months ago. The patient gave a history of typical appendix trouble; we made a diagnosis of acute appendicitis and with our habit of following the ileum along to see if there were any adhesions or bands, we found that his ileum was held deeply in the pelvis to a large nodule which was a diverticulitis. It did not seem wise to more than free it. In freeing it we relieved the doctor of his symptoms. He has been comfortable since. I presume he will have to undergo an operation for diverticulitis. Had we not gone beyond the appendix and its immediate neighborhood, we would not have relieved all of his symptoms.

THE RELATION OF SO-CALLED ETHER PNEUMONIA TO PELVIC AND ABDOMINAL SURGERY.

BY

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ONE of the most difficult things about the science of medicine, which is yet in its developmental and formative stage, is that as scientific knowledge advances we have to unlearn so many things we have been taught. Theories and impressions received to-day have to be revised to-morrow by the discovery of new facts. To give up an idea or an impression that has been firmly implanted in our minds for years and readjust ourselves to changed conditions, based on new discoveries, is not always easy.

For many years it was commonly taught that ether irritated the bronchi and was largely the cause of what was known as post-operative pneumonia. Such pneumonia was spoken of, and still is in most hospitals, as "ether pneumonia;" yet any surgeon in reviewing his experience may find many facts to disprove, and few or no reasons to prove, that ether is the cause of pneumonia after an operation. It is astonishing that this misconception, that ether has a harmful effect on the air passages, is so widespread. In reality, that this view is erroneous has long since been proven both clinically and experimentally.

Ether is administered in most hospitals several times every day, yet the condition known as ether pneumonia is a rare occurrence compared with the number of ether administrations given. If the pneumonia were the result of the ether, we ought to expect to have many cases every week. Again, if ether produced all the havoc with which it has been credited, the administration of it by the intratracheal method might almost come under the classification of criminal malpractice; yet we know that this method is safely practiced every day.

Rovsing has proved experimentally that, although ether does occasion increased secretion of the salivary glands of the mouth, the larynx and the trachea, the bronchi are not irritated at all, even

when the animals are killed by administering ether through a tracheotomy tube. The only way, therefore, that ether can produce pneumonia is by the aspiration of the accumulated saliva in the throat, usually the result of technical error on the part of the anesthetist who should not allow the secretions to accumulate in the throat. Such secretions may, of course, be easily infected from the buccal cavity. It is quite possible under such circumstances that tonsillar infections, involvement of the nasal accessory sinuses, or the teeth may be one of the causes of postoperative pneumonia. Attention has frequently been called to the importance of the sanitation of the nose, throat and mouth before all operations.

Mikulicz, as far back as 1898, on account of the somewhat frequent occurrence of postoperative pneumonia, deserted ether and took up chloroform in the belief that the pneumonia was due to the irritating effect of the ether. To his great surprise, it appeared that the cases of chloroform narcosis were followed more frequently by pneumonia. He, therefore, decided to give up narcoses by inhalation entirely and, thereafter, employed local anesthesia in all operations, even in major operations. To his still greater surprise, the result was that the lung complications, far from decreasing, increased to a considerable extent. He had twenty-seven cases of pneumonia in 114 laparotomies. This experience overthrew the old conception that postoperative pneumonia was due to inhalation narcosis.

Cunningham's very thorough work on the development of the lymphatics of the lung are both interesting and illuminating. He found that the lymphatics approach the lung from three different sources: From the two jugular sacs there are right and left lymphatic trunks, and from the retroperitoneal sac there are vessels which come up behind the diaphragm. The ducts which grow down from the neck meet in a plexus which surrounds the trachea. In the primitive lung the general pattern of the organ is very simple. It is obviously blocked off into large lobules by wide connective tissue septa. In the center of each lobule are the bronchus and the artery, and in the septa are the veins. At the hilum the tracheal lymphatics divide into three plexuses, one spreading on to the pleura, a second following the arteries, and a third the veins. The plexus which follows the veins grows rapidly to the pleura and spreads around the border of each primitive lobule, blocking off the pleura into polygonal areas. From this pattern the pleural lymphatics develop. At a much later stage the lymphatics grow down from the center of the lobule along the bronchi.

The lymphatics of the diaphragmatic surface of the pleura grow up behind the diaphragm from the retroperitoneal sac. This relation of the pleural lymphatics to the abdominal lymphatics is of the greatest importance in the consideration of the development of pleurisy and pneumonia following abdominal conditions of a septic nature. It is clearly seen, therefore, from this study of the development of the lymphatic system, how easily infections may travel from the pelvis or other parts of the abdominal cavity up through the retroperitoneal lymphatic system to the pleura, the base of the lung or the bronchi.

If we look upon pneumonia after an abdominal operation in the same light as we do upon the development of a subphrenic abscess after an appendectomy, we find they bear the same analogy to the point of original infection. The only difference is that in the one case the new focus of infection lands above the diaphragm and in the other below it, but both are brought about by the carrying of infection from the original source in the abdomen up through the lymphatics and veins by the retroperitoneal route. This idea is further strengthened by the fact that most postoperative pneumonias will show a mixed infection containing streptococci, colon bacilli or other organisms in addition to pneumococci. On the other hand, it is often true that the appendix, the gall-bladder, the Fallopian tubes and the ovaries may be the seat of a pneumococcus infection.

Says Rovsing: "One curious fact should long ago have aroused the surgeon's suspicions, namely, that almost every so-called ether pneumonia manifested itself after a laparotomy, while it is extremely rare to find pneumonia following operations on the extremities, the thorax or the head. This occurrence is too unusual to pass by unnoticed. In the main, it is due to two circumstances: (1) That peritoneal infection is conveyed to the lungs partly by way of the lymph vessels and venous blood and partly by embolism. (2) That the sore-bellied patient after an abdominal operation does not dare cough or breathe deeply, for fear of causing himself pain. The result is imperfect aeration of the lung, and imperfect elimination of secretions. If, therefore, the patient is already suffering from bronchitis, or if an infection of the lung sets in, the development of a pneumonia is greatly favored and encouraged by the deficiency in expectoration and lung ventilation."

In this connection, it should be remembered as a matter of history, that the first employment of ether in medicine was as an inhalation remedy for certain lung diseases such as asthma, emphysema, bronchitis, etc. Rovsing is authority for the statement, which is borne out in the experience of others, that in certain badly afflicted lung patients who have to submit to operation, that ether is not only

well tolerated but, in a good many cases, it seems to have a specific beneficial effect on such lung conditions.

It would seem proper to conclude, therefore, that cases of pneumonia following operations are not due to the ether. The term "ether pneumonia" should be discarded and forgotten. Post-operative pneumonia occurs with great rarity except after abdominal operations and is then, probably, due to an infection already existing in the bronchi or lungs at the time of operation, or to imperfect aeration and ventilation of the lungs by reason of the fear of taking deep breaths after a laparotomy; but in most cases the pneumonia is a *secondary infection of the lung* following a septic abdominal condition.

BIBLIOGRAPHY.

Cunningham, R. S. Proc. Am. Assoc. Anatomists, *Anat. Rec.*, vol. ix, 1915.

Rovsing. Abdominal Surgery, 1914.

DISCUSSION.

DR. GORDON K. DICKINSON, Jersey City, N. J.—The conclusion of the author that all of these pneumonias are not directly due to the ether is true. In the investigation of the subject of anesthesia in order to prepare a paper for one of our societies a little while ago, I found that ether produces a vascular stage of pneumonia. Those who go to the far north on voyages, where there are no germs, will pass through the vascular stages of bronchitis and pneumonia, but not to the full extent. In animals you get the vascular stage after ether and chloroform.

A doctor in my neighborhood goes to Crile's Clinic where they have as good anesthesia as in any part of the country, and patients who are given gas oxygen anesthesia, get a pneumonia, and are sick for five or six days. We have been using gas anesthesia very largely in our abdominal operations.

There are two or three factors to be considered in connection with the development of pneumonia following anesthesia, one of which is that germs on the tonsils back of the tongue and hanging there may be insufflated; the other is a slight drain from the abdominal cavity. Another thing which I have noticed is that the patient is usually transferred to a place where the air is poor and ventilation imperfect.

Some years ago I was taught, no matter how cold the weather, to put pillows under my patients, send them to bed covered around the chest, with warm water bags, open the windows widely, and induce a draught. Since then I have been following that plan my pneumonia cases have been reduced considerably.

DR. JOHN W. KEEFE, Providence, Rhode Island.—I believe that many of the pneumonias, as we call them, are decidedly different

from what we call acute lobar pneumonia, and are due to an infection, and that infection is carried through the blood, but not directly through the mucous membrane of the bronchial tubes. I think very seldom is it carried through the lymphatics, but that most of our infections are carried through the blood.

We have what we call inhalation pneumonia, that is, the inhalation of some vomitus from the stomach, or some mucus collects in the throat, and we call that also pneumonia. We have a room where we send most of our severe cases after operation, whether they are cases of abdominal or of general surgery. I have noted many times in the winter, that we have a series of cases that we call ether pneumonia or bronchopneumonia, and several times, after refusing to send our patients to that particular room, until it was washed, aired and fumigated, we have had no further trouble. Whether there is something in the atmosphere they breathe in that particular room in the way of septic material floating about, I cannot say, but I do know that after thoroughly cleansing the room these cases of pneumonia have ceased.

I want to put on record an interesting case I had this last spring. It was a case of septic pneumonia following a tonsillectomy. In looking up the literature I found a report of twenty-eight cases of septic pneumonia reported from Mt. Sinai Hospital, New York. All of these cases of septic pneumonia followed tonsillectomy. A minor operation was performed on my patient, and within a week or so she was given ether and had her tonsils removed. Everything seemed all right until the third day, when she developed a temperature and cough. She had three or four different foci in the lungs. She developed empyema, so that it became necessary to evacuate the pus in the pleural cavity and drain. She ultimately recovered. I feel the pneumonia was brought about in this case through the circulation; that probably some septic material entered the circulation during the tonsillectomy.

DR. CHANNING W. BARRETT, Chicago.—In the Cook County Hospital, Chicago, where thousands of operations are done in a year, at one time the internes gave the anesthetic, and during that time the percentage of morbidity and mortality from anesthesia apparently was large. In those days the internes took turns of one month in giving anesthetics. Last year a change was inaugurated, and now we get our anesthetists through a civil service examination which is open to nurses or doctors. Of the four who qualified at a recent examination, one was a lady physician who had had a good deal of experience, and three of them were nurses. Under that régimé the number of pneumonias has decidedly decreased. Also we have this advantage, the patients are not sent back to the ward with other patients, they are not sent to the general ward, but to a separate recovery ward that has opportunity for a good deal of fresh air. We make free use of the partial Fowler position with the head of the bed elevated. Under that arrangement we have very little pneumonia.

I think it is very plain to all of us that pneumonia following

operations does not come entirely from the anesthesia, but it does seem to me that prolonged anesthesia, choking anesthesia, the inhalation of septic material, etc., plays a very important part in the irritation which makes it possible for the germs to develop in the lungs.

DR. JAMES E. SADLIER, Poughkeepsie, N. Y.—I desire to express my appreciation of the paper presented by Doctor Darnell. My view of this question leads me to believe that while we do, occasionally, have an inhalation pneumonia following an improperly administered anesthetic, yet the cases constitute a relatively small number, and as suggested by Doctor Barrett, there is usually some other element that should be taken into consideration. In my own practice there are several factors I endeavor to avoid. In the first place, I aim never to operate an elective case where there is an acute inflammatory condition of the upper air passages. This is a marked factor in the avoidance of pneumonia. Secondly, it has always seemed to me that after these patients have been returned to bed, and are thoroughly conscious, each should be impressed with the slight danger of the pneumonia and be encouraged to breathe deeply, thereby giving the lungs needed exercise. The third point is the question of the clothing of the patient while in bed. This matter can be governed to better advantage in the smaller institution than it can be in the larger general hospitals, like the Cook County Hospital referred to by Dr. Barrett.

In my own practice, if a patient comes from the country in cold weather, with a heavy undershirt on, and has been accustomed to wearing such a garment, we allow him to wear a similar garment after the operation. On the other hand, if he has been in the habit of wearing a light under-garment, he has the privilege of wearing the same kind after the operation. In other words, we allow our patients to wear the type of clothing to which they have been accustomed.

In my own institution where we can govern such matters, we have practically no pneumonia following anesthesia, but in general hospitals, where patients wear institution clothing we do occasionally have pneumonia following operative work.

DR. JAMES E. DAVIS, Detroit.—Microscopic sections of lung tissue from these cases show a focal involvement usually. Although there is a general involvement of the vascular interstices, there is a hyperemia or even an edema of this portion of the lung tissue, and here and there a definite focus of infection. It seems to me we see different types of cases, speaking from an etiological standpoint. An improperly prepared patient who comes to the operating table with probably some food in the stomach, is a case that will likely have a pneumonia from the entrance of food particles into the respiratory tract; while there are other cases that doubtless come from the lymphatics of the abdomen, and this leads me to say that it is interesting to note the conditions that govern the movement of lymph within the lymph vessels. Ordinarily in the extremities we do not have movement of the lymph, but in the lymphatics of the

abdomen some of the larger vessels have a fairly constant movement of lymph. That movement of the lymph can be accelerated by acute conditions. For instance, the movement of the patient. Anything that will stimulate the patient, such as the giving of certain chemicals, will stimulate the movement of the lymph. Opium will usually retard that movement, and for this reason then it is a good thing to give opium after an operation to prevent the rapid movement of the lymph from the lymph vessels of the mesenteric system.

Dr. Barrett has spoken of elevation of the head. It does seem to me that it is an excellent procedure, if for no other reason than the hydrostatic advantage obtained for the lungs, and if we couple with that position the use of tap water in the rectum, the natural forces are augmented to counteract the movement of the lymph.

Dr. Albert Goldspohn, Chicago.—What I have heard here to-day rather confirms my previous opinion on this subject; that the pulmonary infection after operation is indirectly the result of ether as an anesthetic that has the pronounced tendency to produce oversecretion of the bronchial mucous membrane. I think it is not fair to say the anesthetist should not permit the accumulation of such mucus in the bronchi and pharynx, when ether is given alone without preliminary medication and to the degree of producing complete relaxation for any length of time. I do not believe that I could accomplish that feat, and I have not seen anyone else do it without getting sufficient mucus accumulated in the respiratory tract to cause some degree of asphyxia. This is quite uniformly prevented by one or more doses of atropin, scopolamine or hyoscine given previously with morphine enough to fill another important indication. This I have always done for at least twenty-five years. And I do not remember having a case of postoperative pneumonia. Bronchitis yes; but nothing sufficient to cause a rise of temperature. And I am not a speedy operator. If the preliminary dose happens to have been forgotten, then I am badly handicapped. I am annoyed by the rattling of mucus in the trachea and in the mouth. I think it is cruel to allow a patient to endure such a thing when we can avoid it.

During all these years I likewise have needed the morphine to put my patient before operation into an indifferent attitude of mind, quite in unison with Crile's principles. I want to avoid the fear that I might have if I were going upon the operating table. I think there is much need for at least one preliminary dose, of one-eighth, or one-sixth, or one-fourth of a grain of morphine, with a proportionate amount of the other drug, to allay the patient's fears, to avoid the accumulation of the cruel and dangerous mucus, and to secure tranquil sleep for the patient for a couple of hours after operation, and thus eliminate the struggling, vomiting and noisiness of such patients when they awake from a purely ether anesthetic.

Theories of postoperative pulmonary infection by way of the blood or lymph channels seem rather remote in the presence of such a direct medium for carrying such an infection from the mouth into the bronchi as such an accumulation of asphyxiating mucus presents.

Dr. Francis Reder, St. Louis, Missouri.—The term ether

pneumonia has been accepted by the profession in general and is used as such in the literature. Under such conditions it is not an easy matter to eliminate such a popular term. It is simply called ether pneumonia because it occurs in connection with the administration of ether. In addition to the possible causes that have been mentioned, there is another factor which is to a great extent responsible for the development of pneumonia. It is the change of temperature a patient is subjected to after the operation is finished and he or she is returned to the room. Such a patient often is in a state of perspiration. The journey from the operating room is usually along a hall whose temperature is much lower than that of the operating room. Often an elevator trip is taken with the patient to reach the bed. This does not better the chances for the patient. The blankets about the patient are frequently inadequate, often the feet are protruding unprotected. All this together with the patient's lowered resisting power seems to me to be a cause for pneumonia during the postoperative period.

DR. DARNALL (closing).—I wish to thank the fellows for their free and liberal discussion. There are one or two points I want to refer to briefly. Dr. Barrett and Dr. Reder both spoke of causes which lower the vitality of patients. If there is anything that lowers vitality we know that infection is more likely to take place.

Another thing is with reference to choking or imperfect anesthesia. As far as the accumulation of bronchial secretions and mucus and the rattling of mucus in the throat are concerned, a good many years ago that obtained more than it does to-day. In those days we entrusted the administration of ether to the average interne, and we were more or less annoyed with it. Sometimes the secretions were sucked back into the bronchial tubes and larynx and infection occurred from above. Since ether has been more skilfully administered and has been preceded by morphine and atropin in our clinic, we rarely have any trouble with the secretions. Three cases of postoperative pneumonia have occurred in my experience. One case had a slight bronchitis when operated upon, and I have reason to think, so far as I can trace it out by analogy, the other two cases came from pelvic infection. One was a severe septic abortion, and the other was a severe case of obstruction of the bowel with pelvic abscess and appendicitis. Those are the three cases I have had in my experience.

Dr. Sadlier remarked about clothing. That is a valuable suggestion and I want to thank him for bringing it to our notice. A patient who comes into the hospital wearing thick-lined underwear, should not have a thin nightshirt put on him just after operation. Let him continue to keep his shirt on.

There are one or two things I want to drive home. I feel that postoperative pneumonia is a secondary infection and not an infection in the same sense that we speak of a lobar pneumonia. It may come from a dirty nose, bad tonsils or decayed teeth; it usually comes up the other way, by the retroperitoneal lymphatics and veins.

I would commend to every one of you Cunningham's article in the proceedings of the American Society of Anatomists which is a very thorough and scientific exposition of the development of the lymphatic system.

There is one other point I want to call attention to in connection with these pneumonias. With our classical lobar pneumonia we are taught that the condition clears up by crisis; but these so-called ether pneumonias do not clear up by crisis but by lysis. There is a gradual descent of the temperature curve, which is good evidence to my mind that it is not the same thing as an ordinary pneumonia.

HOSPITAL MANAGEMENT.

BY

GORDON K. DICKINSON, M. D.,

Jersey City, New Jersey.

In the good old days the hospital patient was looked upon as "the direct representative of Christ," and spoken of as "Master or Lord," "Domini nostri pauperas," and "Our Lords the Sick." How different is the feeling concerning hospital inmates these days! How painful it is to those who love the poor and are interested in them, and in their struggles against the results of ignorance and fate to notice how the poverty stricken sick man or woman is viewed!

In the beginning of hospital work, the patient was the important consideration. Doors were wide open; all were welcomed, and the attending physicians and surgeons were held in exalted position. The efforts of the latter were respected; indeed, they were honored. Every endeavor was made to sustain them and their reputations, and to aid them with as efficient nursing as could be procured. Conditions then were as they should be. The head of the hospital was the patient and the patient's interested family with the board of managers as their servants. The hospital was constructed and maintained for them. Their interests were considered paramount, and to them was extended not only every effort toward relief, but cheerful surroundings and all that tended to drive from the mind home-cares, worries and stalled income.

But as time went on changes, necessarily, took place; and hospitals, the result of a benevolent feeling for the sick, developed into three distinct types: Those conducted by sisterhoods, municipalities, and private interests.

In the first, there is to-day perhaps the best representation of the true spirit of the hospital. As in the Bible, the Good Samaritan finds one who has been attacked by thieves, stops on his journey and at the risk of being attacked himself, stoops over to give comfort and relief to the injured, so do the sisters' hospitals seek out

the poor and welcome them to their institutions without leading them to feel that they must contribute or be disturbed in mind.

The municipal hospital, born in politics and maintained by the public exchequer, always skimped in finances, with a medical staff not selected for efficiency, sending out nurses half-trained, seldom comes up to the high ideal of diagnostic and therapeutic efficiency, nor is it productive of that communal uplift which should be expected.

The other hospitals, inaugurated by philanthropic bodies, have sprung up like mushrooms anywhere, regardless of necessities, and are living a life very much according to their own ideals.

Thus it is seen that hospitals are not uniform, but conducted on most diverse ideas and plans. Whereas, the original notion was simply to care for the sick-poor in full sympathy, now changes are occurring which will materially modify them and their incentives, the present condition with these institutions being similar to that of surgery in the 70's.

As medicine has advanced and changed very largely from an art to a science, and as the patient in bed is a most important subject for the education of the profession, hospitals are rapidly developing into educational centers wherein the interns and nurses, as well as the attending and even the outside profession are enabled by the knowledge obtained to strengthen themselves in diagnosis, to offset false notions and wild beliefs, and to become more skilful in treatment.

The intern, now as a rule in his fifth year, needs the hospital for clinical instruction. In the past he was generally received as a first-class orderly. More recently, as a clerk, but now that the time has come when he is to be considered a student in a school, hospitals must awaken to their obligations to him.

Our institutions advertise for young women to come to their training schools. They give them a book. They ask them to recite. They tire them with ward work, and then forget to train them.

For fear of offending the public, many hospitals not only neglect to secure autopsies, but rather discourage them. They do not want to disturb those who are saddened by calamity, and yet it is through autopsies that we obtain the largest fund of knowledge and gain the most material for future work. This all-important institution, gradually developing in spite of indifference, should be divided into three sections: The professional side; the board of managers; and the superintendent.

The professional men deal with the sick and the disabled. They come to the bedside; they study their cases; they worry over what is best to do. They work in concert with the nurse, and in them is that conscious striving to help not only the patient but to help the institution help the patient. Their whole life is tied to their work and the hospital is an integral part of them. They represent very largely the Christian spirit which first instigated the formation of hospitals. They are allied by nature to the Good Samaritan who risked life and suffered discomfort to help the poor stranger. The nature of their work, the life they live, and the education they have obtained, naturally lead them to be democratic. Perhaps at times they are restive because of dogmas, rules and red-tape; but ever kindly in intent, easily led, and quick to reciprocate.

The board of managers, for the most part composed of those who know nothing of the hospital's workings, who spend most of their time in offices and business houses, meet perhaps once a month and discuss matters pertaining to an institution which they seldom, if ever, visit. They know not the wards. They know not the attending staff, nor the nurses. They accept but one source of information as to hospital conditions, that is, the superintendent. Their duty should be to finance the institution, to see it regulated so that the public will be pleased and a kindly feeling engendered in the neighborhood. The work of the professional staff should be honored and the staff strengthened in every particular as to efficiency and institutional interest. Genius and talent should be sustained. Conditions should be permitted which would enable the clever one to develop and the clod, or the one who is a misfit, to be dropped.

Up until 1910 there were but few sanitaria. To-day they are sprouting up all over the country. The hospital to be successful must please the people as the sanitaria do. Thus much depends upon the superintendent. He occupies a position which has never been defined. He should be one who correlates and coöperates; whose mind is bent on harmony and the making of a happy family, with but one inflexible rule—that all who come and go shall be pleased.

In an investigation of the hospitals of the writer's State, he found as many types as hospitals. No two had the same notion as to what was best. None administered with a properly conceived idea as to a standard, and in every one more or less dissatisfaction, particularly within the medical staff existed. The very men whose

abilities should be respected, the ones whose energies were given gratis daily, were the ones disturbed and allowed to be disturbed.

For some reason the medical profession seems to have a hoodoo. For some reason it does not receive the full respect and courtesy. Perhaps it is because of the fact that only recently the ranks were to a large extent filled by the father's sons, men who were failures at everything else and, in a year or two, received diplomas, signed and sealed, which put them on the public to do the best they could. It is these incompletely educated men who, even to-day, preponderate in the profession. But the medical colleges have had the courage to raise their standards, and to cut down their clientele. Fewer and better doctors are being turned out. In another five years, perhaps, every regularly graduated physician will have had as complete an education as may be obtained from schools. In another ten years the young doctor is baked over and has received the discipline of general practice. He will then be ready for appointment on a hospital staff. We unfortunates of the first-class, who have had to strive for the best even though incompletely educated at the start, will be under "the low green tent." Then, perhaps, the profession filled with hundred per cent. educated men, will be honored and respected, and hospital staffs not tolerated and regulated by rules as now.

But what is to be the proper means for controlling this unhappy chaotic condition of to-day? If matters are allowed to proceed as they are, the majority of hospitals will be run dogmatically by boards of managers who fail to appreciate the proper ideals of a hospital. How can we expect it to be otherwise? What institution, what business concern is managed as our hospitals? How can one expect good results and perfect accord and harmony where so much depends upon personality, public interest and trust? In days past the manager of a concern would sit in a closed room. In progressive institutions of to-day the manager sits where the public may see him, where he may be approached and become acquainted with the people.

In many towns medical clubs have been formed; some limited in numbers, others not. These bring together the physicians of the community. This results in a better acquaintanceship, produces friendships, and leads the members to feel that the other fellow is not as unethical as they thought. So, with our hospitals, will it not be wise to amalgamate the three bodies? Will it not be best to place on the board of managers, every man of the attending staff, every man who goes to the bedside, who knows the hospital and his

patients, who by reason of his general practice knows the community, and who has a large public influence; this would not only entitle him to serve on important committees, but one would exact him to study the hospital administration and predicaments. He would thus give to the board of managers a broad full interpretation of hospital affairs and undercurrents, so that matters may be acted upon wisely, that unnecessary rules and regulations may not be instituted, and that there may be a warm, cordial feeling in all departments at all times. In this way a proper education of the laity as to hospital needs would be accomplished. At the same time the physician would become interested in the administration of the institution and would receive a tutelage which has been denied him in the past and so prevented a proper amalgamation of interests.

But it is feared that even this will be too slow and inaffective now, because through the hypnotism of habit the medical man is looked upon as a disturber; consequently he should be eliminated from council bodies. True reform must come from without. Tendencies are already noted from that direction. The colleges feel the necessity of keeping some control on the scholar in his fifth year while intern in an institution. They have a right to make some demand upon the hospital holding such intern; but are at a standstill, because they fail to comprehend how to raise the standards of a hospital.

The American Medical Association has started a movement for standardization of hospitals which will include administration. The State Medical Societies are making similar endeavors. The American College of Surgeons, through its efficient director, is also quietly working in the same direction. There is, however, another power more potent than all, but more unpleasant to consider; that is the State Legislatures. Shall we wait until the State demands that our hospitals be controlled by some central body? Shall we wait until the hospitals, like our schools, have a board dictating policies and methods and enquiring into results? Or shall we, the profession, take it upon ourselves to thoroughly investigate what hospitals are and what they should be? and, How the different factions correlate, and endeavor to find some one way to satisfy the professional requirements of the patients and those attending them? Would it not be well to have our large National Societies come together in all earnestness and attempt a solution of the problem? May the American Association of Obstetricians and Gynecologists initiate it.

THE SURGEON'S RESPONSIBILITY TO THE ECONOMICS OF THE HOSPITAL.

BY

EMERY MARVEL, M. D., F. A. C. S.,

Atlantic City, N. J.

"HOSPITALS are managed with a laxity that exhibits extravagance, waste and general economic inefficiency" is the verdict rendered by an eminent efficiency expert after he had made a survey and study of a large number of institutions. Regrettable as is this declaration, I am convinced that it truthfully tells the condition, and venture now to call attention to it prompted by a hope that in so doing an effort may be stimulated to at least partly correct the evil. Why inefficiency to such marked degree should be tolerated in a hospital, when if such existed in a bank or similar corporation would bring forth a vigorous protest from those interested may have an explanation, but certainly has no justification. It might be explained by the fact that there are no stockholders expecting pecuniary gain; or, that the directors are not held liable for the economic loss; or, as the dominating factors contribute their services gratuitously they are not so exacting; or that the managerial agents being multiple and sharing divisional directions, there is no one person upon whom is centered the responsibility. If these reasons should explain the existence of this undesirable state of affairs they yield no justification for it, and the further endurance of the customs producing the condition should be terminated.

There exists a mutual dependence between the surgeon and the hospital; and likewise the greater service of the one is proportionate to the higher quality of the other. Reference to the surgeon here is meant to include also the physician. How the hospital may be regarded in the community is greatly due to the character of the surgeon; the quality of the hospital reflects the surgeon's efforts and his value. Much, if not the greater part, of the responsibility for the success of the hospital, and, too, for a large proportion of the dissipation of its resources, rests upon the surgeon. The institution

is constructed and maintained for the care of the sick: the direction for administering the needs comes from the surgeon. Laymen may form the governing board having to do with the financial administration; their work is to provide the means through which the needs as prescribed by the surgeon shall be applied. The surgeon is therefore the fundamental power. I am mindful of those familiar complaints too often listened to from the staff member, that "the medical staff has no voice or power in the direction of the hospital." How much these complaints evidence the enfeeblement of the complainer is obvious. The more we study this condition, more convincing is it that the managing board are receptive to, in fact seek, the counsel of the progressive surgeon. When complaints to the contrary are expressed it is evidence that the lights of the complainer have either been hidden under the bushel, or more often the lights are too dim to be seen.

He that provides the hod and the brick from which he moulds the walls of his own house knows well the cost of the material and the labor required. I have often thought if every surgeon had an apprenticeship in managing a hospital every expense of which he were obliged to pay himself, how much differently he would handle the assets of the institution he is supposed to serve. I am constantly impressed with the small percentage of our men that show evidence of any familiarity with the cost of articles which they prescribe, and further, even to recognize in some a disdain for the thought that they should give consideration to the matter of expense. With a full realization of the first and paramount duty of the surgeon to conserve the comfort, protect the life and minimize the morbidity of his patient, his duty is but little less to conserve the economic use of the hospital's resources when such may be accomplished consistent with his best service to the patient.

Discipline is essential to secure the best services from the nurses and internes. Systematic schedules are defined for their observation and guidance, yet many surgeons have seemingly no regard for punctuality upon appointments at operations, or regularity for hospital visits. The waste of time of the nurses, internes, orderlies, and other helpers occasioned by the surgeon who is late at an operation, fails to secure his proper consideration. A half hour's delay means a loss for the combined forces waiting of a half day's individual service, for which the hospital pays. But that is not all it means. Such a delay has upset the working program of the institution by disturbing the day's subsequent schedule; and necessitates additional loss of time in gaining a readjustment. With rare exceptions the surgeon

can methodize his visits that require the helping services of the nurses and internes, and certainly can arrange to be punctual at operations. It is well that he should not take from the hospital these hours of service. It is not only a waste, a useless dissipation of the resources, it is the taking of that which belongs to another. Is it honest?

It is my belief that those ordinarily performing the interne service have a desire to serve well the purposes of the institution. That there are individual exceptions among nurses, and internes, as well as among servants, there is no doubt, and yet the adverse influence of these bad-actors is increased or lessened in proportion to the general harmony and good spirit prevailing. It is within the power of the surgeon to maintain and promote such a spirit. It is his privilege, and likewise a duty, to stimulate enthusiasm for work among the nurses and internes. Discreetly discrediting the improper doings and the praising of meritorious work lies within his province and when exercised goes far to help the general good. By the general influence which he exerts upon those under his direction he becomes an economic asset or a liability to the institution.

Waste of supplies and the extravagant use of unnecessary or unduly expensive articles deserve to be deplored. To use piperazin at a cost of twelve dollars per ounce, when a salicylate costing fifty cents yields a more potent remedy, may be tolerated in private practice when impressions are being registered through the pocket-book, but is little less than a crime when imposed upon the unconscious hospital exchequer. The use of alleged dressing-powders purchased at fabulous prices, or the application of precious-metal foil to cover sutured sterile wounds, when the wound would heal equally as promptly and just as effectually by the simple dressing of sterile gauze, is indeed an extravagance. The extravagance of useless surgical instruments and equipments is eloquently testified to in the storeroom of every hospital. Such items as unnecessarily increased laundry cost is exhibited in most operating room work, as well as the waste of suture material. Unduly liberal, and unnecessarily frequent dressings of wounds exhibit waste, if not meddlesome surgery. Ether becomes an item commanding consideration. The prescribing of a certain Chemical Company's product seems to have become a habit with most surgeons; a habit engrafted not unlike a fetich with some. At one time this product possibly deserved the preference given it. Whether it has maintained its merit or not need not be discussed here. Suffice to state other products possess equal merit and one other in particular has gained favor of

preference by those who have studied the subject well. This latter ether is preferred by such institutions as the Union Protestant Infirmary of Baltimore and the New York Hospital. It obligates the hospital but little over half what the first mentioned brand costs, and requires less quantity for the same service. Yet a large proportion of the surgeons continue to prescribe the brand first referred to. These items cited are not all, in fact, they are but few, to illustrate the responsibility of the surgeon in his prescribing economic extravagance and waste of the hospital's resources.

In the community service of the hospital repetitions of the same care are frequently rendered the individual patient, or the subsequent treatment for a like disease or injury is given members of the individual's family. The necessity for the hospital giving this care, with its consequent expense, could have been avoided and this expense saved had intelligent action been exercised. These services are imposed upon the institution ofttimes on account of the ignorance of the afflicted, not knowing how to avoid the disease or the injury. The infected hand patient, who through ignorant procrastination suffers the loss of his hand and endures a morbidity which imposes his care upon the hospital for two or more weeks, should not, and will not, impose a repeated expense upon the hospital for like care when again he becomes a victim of another similar infection, provided he should have been taught the meaning of the simple infection and its significance if early treatment be neglected. Such teaching having been received by him, he is most likely to become a valuable emissary to his family, and also to his acquaintances in enlightening them for their protection, thereby lessening the cost to the hospital for care that might otherwise have been necessary. To protect the hospital against repeated obligations of this type it is obviously desirable that instructions for the afflicted be provided. Two classes of practical instructions may be provided for the hospital patient: that given by the surgeon upon his visits; the other that which should be provided for the convalescent hours. A direct statement from the surgeon as to the cause of the trouble and the means by which recurrence of similar trouble may be avoided is capable of being driven home with force in this way and will effect valuable help not only to the individual but also upon those with whom he subsequently comes into contact. The convalescent hours when the patients congregate for gossip are alike dangerous to the patient and to the hospital. There is a seeming natural desire upon the part of the convalescent to talk operation, and too frequently this talk takes the form of extravagance, if not imagination. Among

some it is the particular desire to highly color personal experience. The hour comes when there is a veritable contest in which one convalescent tries to outdo the other in reciting alleged unhappy hospital experiences. The surgeon, the nurse, and the hospital as well, are misrepresented and ofttimes to the discredit of the hospital and its agents. In these hours of idleness evil imagination is stimulated and fed. Seldom any good comes from these social conferences. Why not protect the patients and the hospital from them, and further, why not provide to utilize this time in giving instruction that will lessen subsequent sickness and accidents among these people. The opportunity for useful instruction is obvious. If the surgeon realizes this he may foster upon the hospital management the conviction of its desire and secure means for this special economic help.

In hospital construction the members of the medical staff have their part. Insistence upon extra building for the accommodation of some special department when after provisions are made the service of the department is not availed of, is a misappropriation of funds. In a recent survey of several hospitals, sixteen institutions had provided for a morgue with equipment for autopsies. These institutions had the usual quota of deaths, yet but four of these had an autopsy performed during the period of a year and only fourteen autopsies had been performed in all of the sixteen hospitals. In one institution a hydrotherapy department had been provided in response to solicitation from the medical staff at a cost of approximately $20,000. At the time of my visit, when a hundred and fifty patients were in the house, together with a very large dispensary service, there had been five hydrotherapy treatments during the previous month. The average cost of constructing and equipping the morgue was $7000, and less than 25 per cent. of these equipments had been used. It is not to discredit the good service an equipped morgue may yield that I refer to this observation; instead, it is to emphasize the inconsistency of urging its needs and then not using it, and, too, to point out the wasteful dissipation of the monies. To influence expenditures of monies for purposes which do not yield a commensurate return in service is an economic waste. The surgeon who influences the building of a morgue or the constructing of a department for hydrotherapy or any other service which is not subsequently utilized assumes the burden for the economic waste.

In order that a more thorough study of a patient be made to determine definitely the true nature of the illness, a preliminary

stay in the hospital is sometimes desirable. The procedure may prove an economy to the institution when the course is expedited, but when procrastination is practiced the course becomes an additional expense. The surgeon should have in mind that every day which a patient is cared for in a hospital there is a cost for the institution to pay. A patient with suspected renal stone to be kept in the hospital for ten days for skiagraphic study when equally as satisfactory study could be determined in two days is imposing an unjustifiable expenditure upon the institution. Under the convenient pretext of "studying the case" ofttimes a patient impatiently waits and the hospital is submitted to the cost for the care, when in truth the indifference or the convenience of the surgeon's pleasure is being served. To conserve the economy of cost for hospital care the morbidity period should be studied. While the haste to operate without clearly defined necessity is to be deplored, to delay operation carries its obligations. To postpone an appendectomy for to-morrow when its removal to-day favors a primary closure with two weeks' morbidity or delay with drainage imposing four weeks' morbidity, shoulders a responsibility upon the procrastinator. Whatever else such delay has occasioned, it has caused an increase of 100 per cent. cost to the hospital for the care of the patient. The surgeon needs to avoid procrastinating study, delayed treatment and protect against extension of stay in the hospital to serve the best economic interest.

It has been my aim to point out some incidents that might illustrate the contention that the surgeon shares the responsibility for the hospital's lack of economic efficiency. It has been attempted in the hope that by so doing some correction might be made. The surgeon is directly responsible for loss of service and the embarrassment to the organization when late for operation, dressings, or other appointments; for the waste in using unnecessary or unduly expensive supplies; for unduly extending hospital care; and for misuse of funds occasioned by encouraging expenditures for construction and equipment which do not give commensurate beneficial returns. A staff surgeon must share responsibility for the neglect to utilize opportunities, which if taken advantage of would benefit the hospital. It is his duty to inspire enthusiasm in attendants; maintain congenial atmosphere for the patients; and to teach improvements in service. It is his opportunity to teach the patient better care for self; give him knowledge to prevent recurrence of disease or injury. His opportunities for service to conserve the institution's interest are many and his responsibility proportionate.

DISCUSSION ON THE PAPERS OF DRS. DICKINSON AND MARVEL.

DR. GEORGE VAN AMBER BROWN, Detroit.—Recently at our hospital the staff appointed me with two others to look into the economics of the hospital, and about the first thing we decided on was this: The most extravagant thing about the hospital is the surgeon himself. He begins by being late for operation, and by so doing, upsets the program of the whole day. Everything goes wrong, but he is perfectly satisfied if he is allowed to operate at that particular hour, but if he finds that his own time has been wasted he is very much upset.

Let us take the question of dry or wet gloves. If the operator is using wet ones, have several boiled for him. If in operating he meets with an accident and tears his gloves and waits to have them boiled again, it takes time and means money. The same thing is true with gowns. The Mayos sent out a pamphlet showing how economy could be practised in the use of gowns. Often an operator will use two or more gowns in one operation, especially if it is a two step operation, or if he is doing pelvic or abdominal work. It should be done with one gown, protecting his abdomen with a large towel. In the use of sponges, it is a common thing to see a man use two or three dozen abdominal sponges where he could have used three or four to a much better advantage. In fact, the structures of the patient would have received less injury, as Dr. Bainbridge pointed out yesterday. Every time you put a towel in the abdomen you do harm. We do not like to use more than we have to. If we put in a dozen we have an increased laundry bill to pay, to say nothing of the harm done the patient.

Catgut is one of the expensive things we use. Time and again I have seen surgeons use 18 inches when they could have gotten along with an 8- or 10-inch piece. They use catgut where silk would be better.

As regards anesthetics, there is nothing that saves the hospital so much expense as the use of gas instead of ether. In considering the financial side, a great deal of the expense comes in the after-care of the patient, who has received ether as an anesthetic, the first two hours before he has awakened from its influence. The patient who has been under the influence of ether for a long time and is vomiting has to have a nurse sitting at the bedside waiting for her to wake up. This is all done away with if you use gas, because the patient in two or three minutes is awake, does not need so much after-care, and there are not the howling and disturbing factors which go with ether patients.

Another thing, the indigent patients in the hospital want to be entertained; they are lonesome; so many of them can neither read nor write, or they are not in the habit of entertaining themselves. If you can give these patients some work to do, have them make sponges, etc., and let them see they are doing it for other people who are sick, they become interested, and it is a great saving to the hospital.

The plea of economy should be the keynote in advocating hospital reform to the officials.

DR. WILLIAM SEAMAN BAINBRIDGE, New York City.—In discussing the papers of Dr. Dickinson and Dr. Marvel, I think all will agree with the many points emphasized by Dr. Marvel, much discussion having been given to them, but the key to the points emphasized by Dr. Dickinson has not received the attention that it deserves. In other words, the important question is not so much the responsibility of the surgeon to the hospital, but the responsibility of the managing board of the hospital to the surgical and medical staff. Team work implies work on both sides. A few extra pounds of cotton or gauze, a few additional ligatures, etc., may be important enough, but they sink into insignificance when compared with the conservation of the surgeon's time, strength, and nervous equilibrium.

DR. CHARLES P. EMERSON, Indianapolis, Indiana (by invitation).—It has been my privilege to have been connected with several hospitals, so I can appreciate the problems presented by the last speaker. To show that these hospital problems are not inevitable, I would like to outline the organization of our University hospital.

The University of Indiana has a hospital which is a gift to the State on behalf of the University by one of the doctors, Dr. Robert W. Long, who started as a poor boy, but who was able to amass a fortune. When first he considered founding a hospital he studied several plans. One was to give the hospital to one of several churches, or to found an independent institution, but he decided, following the advice of his medical friends, that the safest place for a hospital was a University; an independent hospital with an endowment may soon run out of funds because of the changes in value of investments, changes of prices of commodities, and, especially, increased demands resulting from advancing science. If, however, the hospital is a part of a university, the appropriations will increase automatically. Also a university is a safe place for medical reasons, since it cannot easily come under the dominion of one man. And so his gift was a hospital, an integral part of Indiana University. Dr. Long lived nearly seventy years in Indianapolis and so knew most of the medical men of the city, but he did not use his influence in the slightest to hamper the financial, material, or professional work of the institution. When asked to express his opinion concerning appointments, he would reply, "That is up to you and your committees." He visited the wards almost daily to see the patients. He was happy with his gift and enjoyed it for almost two years.

How is the hospital managed? First of all, the hospital is a part of Indiana University; it is a part of the medical school just as the anatomical laboratory is a part of the medical school. It is governed by the medical school committees, the same committees that give a budget to the medical school in behalf of the board of trustees. The same committee that apportions the work in the lecture rooms, and laboratory rooms, also apportions the work in the ward rooms, and any man on the teaching staff is subject to hospital work. It is the laboratory of the medical and surgical departments. The committee is especially careful with reference to the finances of the hospital, and to the same committee is entrusted the finances of

many thousand dollars a year because they were doctors themselves and were not in competition with the men on the staff, and their suggestions as to economies went. Now things have turned around on account of politics; they got rid of that board, and they are paying the penalty for it.

In a private hospital it is not possible to get men that would serve that way, but it seems to me the remedy there is for the staff itself to elect these representatives to serve with the board of directors.

Just one word on the economy proposition and I will not detain you any longer. I happen to have a few dollars invested in a hotel in Cincinnati. I can walk into that hotel to-morrow morning and tell how many guests they have had in the last twenty-four hours; I can go to the treasurer of that hotel and he will tell me how many meals have been served, what the average cost of each meal has been, and what the profit of each meal was within the last twenty-four hours. If the man in charge does not make so many dollars bring in so much return to the dining-room he is called on the carpet. The same business principles should be applied to hospital arrangements. For instance, if you find Dr. Brown on his service is taking care of ten patients at a cost of twice as much as Dr. Bainbridge, you are going to know the reason why. It is simply a matter of book-keeping and publicity.

The next thing that Dr. Dickinson brought up was this: the doctor must have the respect of the board, and we do not have it as much as we ought. There are two reasons for this. In the first place, a long time ago we commenced working for nothing and no one appreciates what he gets for nothing. In the second place, we did not demand respect. A man never gets any more respect than he demands.

One doctor spoke about forming clubs and getting acquainted with one another. It is a good thing to become acquainted with business men and show them that you have got as much sense as they have, and then they will not only respect you as a doctor but as a citizen.

DR. DICKINSON (closing).—I have no axe to grind. I have nothing personal in this matter, but I have great interest in the young doctor—not you men, but the young doctor out in a community who is tied up to a hospital which runs along for fifteen or twenty years and then closes. What is he going to do? You have avoided telling what can be done. Unless we start some inspection among our societies, look into the different communities and standardize hospital management, find out our professional relations to the institution, send on to the different hospitals for information as to how many shall go on the staff, how many shall compose the board of managers, and what their relation shall be, and how important it is to have a superintendent who is agreeable to all, we will not have anything done.

GOITER AND PREGNANCY.

BY

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SIMPLE GOITER AND PREGNANCY.

DURING pregnancy the thyroid gland nearly always undergoes an increase in volume which remains more or less marked all through the puerperal period. According to Seitz, this increase in volume occurs in 65 to 90 per cent. of all cases of pregnancy. Out of 718 pregnant women seen by Rübsammen, 89.5 per cent. of the cases showed glandular enlargement. According to Lange, thyroid hyperplasia in pregnancy has been found in 108 out of 133 cases; when goiter existed previously, it always increased in volume during pregnancy. Von Graef examined 654 pregnant women during the second half of their pregnancy, 48.7 per cent. of them showed a thyroid enlargement. The same author examining 256 pregnant Viennese women found that 44 per cent. of them had goiter. Of course, many of these women had had goiter prior to their pregnancy. This does not disprove anything, as he then found 38.5 per cent. of these goiterous women showed a marked increase in the volume of their goiter during pregnancy and delivery. According to Freund and Lange, hyperplasia takes place sooner in multiparæ than in primiparæ; it appears in the fifth month in the former, and in the sixth month in the latter. It begins to retrocede a few hours after delivery, and keeps on decreasing in size for weeks after. The thyroid, however, never returns to its normal size. Lactation seems to be devoid of any influence over the volume of the thyroid.

The increase in volume is due to hypertrophy and hyperplasia of the parenchymatous elements; colloid and cystic nodules, when present, are only slightly involved. According to Seitz, the increase in volume is due to the action of the placental products over the thyroid. This glandular hyperplasia seems to be intended to destroy the product of autointoxication and changes in the serum caused by pregnancy, and it seems that women who do not show any hyperplasia of the thyroid are very apt to have albuminuria and eclampsia

afterward. The latter part of the proposition is not simply a coincidence, as Lange has shown. Indeed, if in nonpregnant cats one-fifth of the thyroid is removed, no ill effects whatever are observed, but if the cats are pregnant, the same operation causes at once albuminuria and nephritis. Thyroid opotherapy undertaken in such animals causes the symptoms to retrocede at once. Nicholson obtained the same results. The treatment with thyroid extract of four pregnant women with albuminuria and eclampsia gave very good results. Seitz, Döderlein and others believe, however, that eclampsia is of parathyroid origin. Whatever the theory may be, we must admit that thyroid hyperplasia in pregnancy is a physiological process, most likely intended to deliver the organism of waste products taking their origin in the mother and child. Perhaps, too, this hyperplasia is intended to counterbalance the temporarily lost function of the ovary.

In the majority of cases during labor, and especially during delivery, the goiter increases materially in size. Sometimes, it acquires such dimensions that bursting of the neck seems to be imminent. Dyspnea and cyanosis are very marked. It is seldom, however, that the dyspneic symptoms become such as to necessitate surgical intervention. During labor and delivery pains, on account of pressure from the goiter, the pulse in the carotids disappears; this can be controlled easily by taking the pulse over the temporal artery. Guyon considers this phenomenon as an attempt of nature to regulate the cerebral circulation. In goiters of long standing the goiter-heart is always present, and must be regarded as a bad complication. In other conditions, tachycardia may become a very troublesome and alarming symptom.

Treatment.—In all pregnant women, the condition of the thyroid should receive careful attention. If this gland is found manifestly enlarged or altered, and if evidence of thyroid insufficiency is found, the active principle of the gland in some available form should be administered. In that, everybody agrees. Small doses may be given and should be continued for several weeks or months.

As it has even been found that thyroid opotherapy started in the early period of pregnancy prevented thyroid hyperplasia, and as, furthermore, it has been shown experimentally that it prevents albuminuria and nephritis in pregnant thyroidectomized cats, it might be worth while to undertake a series of experiments in order to find out if it would not be advisable to feed pregnant women with thyroid extract, thus hoping to prevent some of the dreaded complications of pregnancy as albuminuria, eclampsia, etc.

In every case of pregnancy complicated with goiter, may it be simple or thyrotoxic, or both together, the wishes of the parents regarding the life of the child should always be carefully ascertained and the situation explained to them. Where children have been lost previously, and the parents are desirous of offspring, all possible means should be used to continue the pregnancy without, of course, undue risk to the mother. As soon, however, as the pregnancy is terminated, the physician or obstetrician should consider it one of his first duties to have the patient seek surgical advice and treatment in order to permanently remedy the thyroid condition.

When pregnancy is complicated with simple goiter only, no one should be unduly alarmed, the course of the pregnancy should be allowed to go on, and in the greatest majority of cases everything will terminate to the entire satisfaction of the patient as well as to the attending physician, even if during labor dyspnea and cyanosis seem at first to threaten to become alarming. If, however, on account of the goiter the patient has previously lost a child, and if the symptoms have been such as to endanger the life of the mother, elective Cesarean section should be selected.

In cases where before labor the dyspneic symptoms are marked, congestion of the cervical region with "caput medusæ" highly developed, it is logical to assume that the dyspnea will be greatly increased during labor. In such conditions, elective Cesarean section can be made before the labor pains have started. If labor and dilatation are already far advanced, pituitrin, judiciously administered, may greatly accelerate labor and shorten its duration. If dilatation is more or less complete, forceps may be necessary. If dilatation is not far enough advanced, but engagement is well started, a vaginal Cesarean section may save both mother and child. As in these cases the sole object of surgical intervention is "to do everything quickly," the induction of labor with elastic bags is, of course, to be rejected as it is a too slow and uncertain process, adds to the mother's nervousness and exposes to rupture of the uterus in delivering a child through a partially dilated cervix.

Thyroidectomy in such conditions should be very seldom undertaken as the operation is rendered extremely difficult by the enormous active and passive venous congestion of the entire cervical region; furthermore, the thyroid during pregnancy is in a state of compensatory hypertrophy, consequently it is difficult to judge how much gland should be removed and how much should be left. Thyroidectomy will be a much safer process after the obstetrical ordeal is over. Tracheotomy must be considered only as a life-saving device.

In all these cases the administration of an anesthetic is a very serious matter, and should be given the greatest care and attention, for it may prove disastrous. When necessary, surgical intervention is better made under local anesthesia.

EXOPHTHALMIC GOITER IN PREGNANCY.

That a woman afflicted with Graves' disease may become pregnant, or that thyrotoxicosis may develop either during, or at least, in connection with pregnancy, is a well-known fact. The point of interest does not lie therein. What we want to know is, how do these conditions influence each other, and what shall be our attitude on these given cases?

The coincidence of pregnancy with Basedow is not so frequent. Out of 15,000 women seen in the Maternity of Edinburgh by Halliday-Croom, only one case of exophthalmic goiter in pregnancy was seen. The other twelve cases which he reported were taken from his private practice, hence his conclusion is that pregnancy and Graves' disease are oftener found among the rich classes than among the poor ones. Bonnaire came to the same conclusion as out of 30,000 pregnant women he saw there were only two cases of exophthalmic goiter.

Seitz has collected 112 cases of exophthalmic goiter complicated with pregnancy from his own material, from literature, and from circular letters. He has carefully tabulated the menstrual history, the appearance of the first symptoms, the history of the previous pregnancies, the therapy employed, and the results as far as mother and child were concerned. He found that hyperthyroidism was not affected one way or the other in 40 per cent. of the cases. A very small number even improved during pregnancy. On the other hand, 67 out of 112 cases, namely, 60 per cent. of the total, were made distinctly worse by gestation. In one-fourth of these 67 patients a serious menace as to health and life was the consequence of thyrotoxicosis; 7 patients died; in 5 cases therapeutical abortion and 11 premature labors occurred; 3 miscarriages, and 3 macerated fetuses were observed. In 7 cases thyroidectomy was performed during pregnancy.

Bernard Von Beck in 260 cases of Graves' disease and pregnancy said that he felt compelled to perform thyroidectomy in 5 cases, and in no case did he find it necessary to interrupt the pregnancy. As Gellhorn says, this is indeed a remarkable record and may be explained by the fact that these thyrotoxic conditions were secondary

to previously existing goiters as in the region where Von Beck is working, goiter is endemic. Theilhaber found that the majority of coincident cases of pregnancy and Graves' disease were made distinctly worse by the disease and only the minority were improved by it. Kleinwachter and Hirst came to the same conclusion that Graves' disease is unfavorably influenced by pregnancy, and that it often has its origin in gestation. It predisposes the patients to uterine hemorrhages and may result in the death of the fetus. Such cases are often complicated with albuminuria. Whitridge Williams considers that pregnancy exerts a deleterious influence on Graves' disease; he found that tachycardia was greatly increased during gestation and lessened soon after labor.

We can consequently conclude that the majority of patients with Graves' disease are made worse by pregnancy. Pregnancy must be regarded as a serious complication in thyrotoxicosis. This is so true that Theilhaber has said, speaking of thyrotoxic patients:

"Girls, no marriage; women, no pregnancy; mothers, no nursing."

Treatment.—So far as Graves' disease is concerned, medical treatment should be given the greatest care and attention as soon as pregnancy is detected. Every form of treatment can be given a trial. Opotherapy with hypophysis or thymus may be attempted; opotherapy with thyroid should be handled with extreme care. Every one of these treatments will sometimes give good results, more often, none, or will make the condition of the patient worse. Up to date, the best treatment yet known is a dietetic, hygienic régime. The majority of cases so treated will be kept in fairly good condition and may be brought to the full term of their pregnancy without serious nervous disturbances. At any rate, during the early period of pregnancy, the treatment must be an expectant one. If later, however, the condition of the patient grows worse, surgical intervention then becomes necessary.

Surgically, two questions arise: Shall we perform a thyroidectomy, or shall we resort to an obstetrical operation? So far, the trend of opinion seems to be in favor of the second alternative. If the fetus is viable, a premature Cesarean section may save its life, which very likely would be lost if allowed to go to full term. If, on the other hand, the fetus is not viable and the condition of the mother is such as to necessitate surgical intervention, the life of the child should be sacrificed without hesitation, as, at any rate, it is bound to be lost anyway. In such cases, the mother's life only should be taken into consideration.

I believe, however, that we should not wait until these thyrotoxic

symptoms complicated with pregnancy have become so serious as to endanger the life of both mother and child. A timely thyroidectomy, as I have performed it twice, seems to be the ideal procedure as it not only wonderfully benefits the thyrotoxic condition, but also allows the pregnancy to go to full term, and saves the life of the child without undue risks for the mother.

Basedow patients should be guarded against marriage, and especially against pregnancy. At any rate, before entering married life they should have thyroidectomy performed in order to safeguard them against any future exacerbations and to protect their future offspring. It is true that in severe forms of Graves' disease, the chances for pregnancy are considerably reduced, because the sexual apparatus is in a state of hypofunction. This, however, is not always the case and pregnancies may occur even in very severe cases of thyrotoxicosis. When this is the case, "sterilization" of the women should be performed.

IS THE OPERATION OF CESAREAN SECTION INDICATED IN THE DELIVERY OF BREECH PRESENTATION?

BY

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A WELL-KNOWN teacher of obstetrics once remarked in the writer's hearing, that if he were asked how to determine the capability of an obstetrician, he would like to be present and watch the operator's method of conducting a breech presentation and delivery; and that he would be willing to let his opinion of the physician's skill as an accoucheur rest on the manner in which the case was treated. This may sound rather like a radical statement, but after thoughtful reflection upon the complication under consideration, it does not seem that such a judgment would be entirely unwarranted.

An abnormality which occurs in 3 to 4 per cent. of all labors, with a fetal mortality estimated by various authors as from 10 to 30 per cent. certainly merits more than superficial thought, and if with our present recognized modes of delivery such an extreme fetal mortality *really* does result, it would seem that we should look somewhat further afield, and attempt to discover and carefully consider some other method which will yield more living children, always provided that the maternal risk is not increased thereby.

With the idea of trying to discover what the actual figures would be in a large number of cases, the writer has attempted to analyze 3412 cases of breech presentation and delivery which have occurred in 97,000 confinements, all in the service of the New York Lying-In Hospital from its inception to September, 1915. An earnest effort has been made to include in the fetal mortality only those cases in which the cause of the stillbirth could be directly attributed to the breech delivery. Such causes as *prematurity*, *placenta previa*, *toxemia of pregnancy*, *deformed pelvis*, *abdominal* and *pelvic tumors* while noted, have been eliminated, as it is impossible, if these complications are included, to determine what proportion of the stillbirths was caused by the existence of the abnormal presentation with the subsequent abnormal labor, and what proportion was due to the complication. Such an elimination in the same way, and for

the same reason is necessary in order to determine the maternal mortality in breech presentation and delivery, and it is most essential to have an absolutely clear view of the maternal death rate, in order to compare it with that of any other operative procedure which we may wish to substitute for the recognized methods of delivery in this complication.

The actual etiology of breech presentation is not entirely clear, it being stated that gravity, flaccid uterine and abdominal walls, impediments to the engagement of the head, etc., etc., all play a large part. Williams(1) believes that in primiparæ, particularly, the existence of a breech presentation always means some disproportion between the fetus and pelvis or the fetus and the uterine cavity. He states, however, that "there will still remain, in spite of the most careful examination, a large number of cases in which no definite disproportion between the fetus and pelvis can be demonstrated before delivery."

There would, therefore, seem to be considerable doubt as to the cause of breech presentation, and the fact of universal disproportion in primiparæ does not seem to the writer to have been proved.

The frequency of the abnormality under discussion in Pinard's series taken from 100,000 labors was 3.3 per cent., in our series the complication occurred in 97,000 cases 3412 times, or 3.5 per cent. or in 2.3 per cent. of cases reaching term. Pinard states that 59 per cent. of all cases occurred in multiparæ. In our series 72.3 per cent. occurred in multiparæ or approximately three times as many as in primiparæ.

In contradistinction to these figures are those of De Normandie(2), based on a much smaller series it is true, who found that breech presentation occurred in primiparæ in 57.2 per cent. of his cases at the Boston Lying-In Hospital.

So far as prognosis for the mother is concerned, the maternal mortality does not, and should not, differ greatly from that of vertex presentation in uncomplicated cases. The maternal mortality in our series, including cases complicated by convulsive toxemia (eclampsia), of which there were thirty-seven; placenta previa, of which there were sixty-three; chronic nephritis, chronic endocarditis, pneumonia, etc., all of which have a mortality of their own, was 0.96 per cent. Excluding these complications, the mortality was found to be 0.47 per cent., which is not excessive, when it is considered that many of these cases had been handled by outside physicians and midwives.

Coming to the prognosis for the child, however, here we find a much higher mortality than in vertex presentation. The fetal mortality is generally estimated by various authors at from 10 to 30 per cent. In our series of the 3412 cases of breech presentation, 336 children *at term* were stillborn, a mortality of 9.4 per cent. 422 were premature, and would in all probability not have survived in any event. We are, therefore, concerned with the treatment of a complication, as a result of which 9.5 per cent. of the children are stillborn.

Regarding the parity of the mothers, 944 were primiparæ; 2468 were multiparæ.

Regarding the fetus, there were 198 stillbirths in the 944 primiparæ; and 560 stillbirths in the 2468 multiparæ, a percentage of 21.6 per cent., and 22.7 per cent., respectively. In other words, the difference in mortality in the children between primiparæ and multiparæ was so small as not to be considered.

Broadly speaking then, the operative choice of a means of delivery in breech presentation lies between the usual method by the vaginal route, or by the means of an abdominal hysterotomy, which latterly seems to be the panacea for all obstetrical ills and malpositions.

Williams of Boston(3), in an article entitled "Cesarean Section for Primiparous Breech Presentation," frankly expresses himself in his concluding paragraph as being committed to the abdominal hysterotomy for a breech presentation in the majority of cases, and quotes the history of two cases in which he performed the operation with favorable outcome for both mother and child.

It is unfortunate for the subject in hand that these two patients showed exactly what they did, for in the first one, while it is true that the fetus presented by the breech, the patient in addition had a submucous fibroid; this prevented the descent of the presenting part and would have been just as great a bar to a fetus presenting by the vertex. According to the measurements given, the pelvis was large, the baby of moderate size (7½ pounds), and the abdominal hysterotomy in the last analysis was done, not for breech presentation, but for fibroid. The second case above referred to showed a 9½-pound baby, and a pelvis with a true conjugate of 10 cm. with the external measurements very slightly contracted, and Williams takes the ground that owing to the fact that the breech was not engaged an abdominal Cesarean section was indicated, which he successfully performed. This argument presupposes that a 9½-pound breech cannot be delivered through a pelvis which is practically normal, a statement which the writer is strongly inclined to doubt.

Let it be understood that we are far from believing that there will not occasionally be a patient, either multipara or primipara, in whom there will be a disproportion between the size of the child and the mother, in breech as well as in vertex presentations, and in whom an abdominal Cesarean section is indicated in order to save the life of the child; nevertheless, there is a definite maternal mortality to Cesarean section, even in the best and most conservative hands, of from 2 to 4 per cent. which compares very unfavorably with 0.47 per cent., to say nothing of the danger of rupture of the uterine scar in subsequent pregnancies, which Findley(4), in a recent article, estimates as at least 2 per cent. and it is the writer's earnest belief that at the present time too free a use of abdominal hysterotomy is being advocated.

He is far from being overconservative in regard to this operation as two papers previously presented before this association will attest, but at the present time he is fully convinced that a careful observance of the customary technic in delivery, interference when progress is not satisfactory, noninterference when progress is certain, even if slow, postural treatment, waiting until the breech appears at the vulvar orifice before attempting to deliver, proper understanding of the technic of extraction of the arms and after-coming head, particularly the latter, with regard to downward traction, warm towels around the body of the child, and care and deliberation with regard to the maternal soft parts, all as laid down in any good text-book, will result in an even lower mortality for the child, than at present, and in many more living mothers, than by what he is forced to believe a too radical and rarely necessary operation, namely, abdominal Cesarean section for the condition under consideration.

REFERENCES.

1. Williams, J. T. *Interstate Medical Journal*, Apr., 1915, p. 384, *et seq.*

2. De Normandie. *Surgery, Gynecology and Obstetrics*, 1908, vol. vi, p. 401.

3. Williams, J. T. *Interstate Medical Journal*, Apr., 1915, p. 384, *et seq.*

4. Findley. AMER. JOUR. OF OBST., Sept., 1916, p. 428.[1]

THE INTERPOSITION OPERATION OF WATKINS-WERTHEIM IN THE TREATMENT OF CYSTOCELE AND PROLAPSUS UTERI.

BY

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ONE bane of those who do any gynecological surgery has been the patient with a large cystocele and a descensus uteri or an hypertrophic elongation of the cervix. Learning my lesson early in my experience with this class of cases, I had for a long time felt very loath indeed to urge such cases to operation by any of the procedures which I was then following. I could not bring myself during this period to the point of promising my patients any relief.

In the mild cases of slight cystocele with descensus, the operation of Stoltz, Emmett, and of Martin, with an accompanying perineorrhaphy, sufficed in most instances to give relief, but in the more severe cases we soon learned that these operations did not at all answer the purpose. Nor in this latter type of case did the operations originated by Gilliam and others before him, which shortened the round ligaments, suspended or fixed the uterus by one or the other of the various methods in use, improve conditions one whit. In spite of these additional operations, the cystocele and descensus always returned.

I tried many years ago, as the result of my failures, to overcome the cystocele by transplantation of the bladder high up on the uterus working through an abdominal incision. I was not successful because I could not hold the uterus up, and I had not the ingenuity to devise, through the abdominal incision, any method which would interpose the uterus between the bladder and vagina as is done in the method under discussion. Five years ago, when in spite of my skepticism but forced by my poor results, I undertook, upon some of my patients, the operation devised by Dr. Watkins, I was astounded at the brilliant cures I obtained. Since that time we have done about an average of twenty to twenty-five of these cases every year, having done twenty-two of them within the current year, and in our

series we have not had a single complete failure, though there is one patient who still has some slight disturbance. Probably in this individual case a different operation should have been done.

This latter case was in a woman some eight or ten years past the menopause, with a very small uterus, and I believed at the time that the procedure devised and advocated by Mayo under such circumstances should probably have been done. As it is, this patient now has a very slight bulging of the bladder, just enough to prevent its complete evacuation and to maintain a slight cystocele, she having had previous to her operation a most marked and troublesome infection of the bladder due to urinary retention and decomposition. With this, and one other exception, we have had only the most gratifying results in our practice, and we have been able to follow every one of our private cases.

On account of imperfect indexing and tabulation in our early cases we are not able to give our exact number, but I am sure that the figures given above do not exaggerate the number. Some of our operations have been done in our public hospital service and of these, which is the second exception, there is one death to report which resulted from a septic infection. Other than these two cases, we have had no untoward results, and if we exclude occasional superficial stitch infections, there have been no complications nor disturbances of any kind.

The difficulties in the surgical treatment of large cystocele with prolapse are evidenced by the great number of procedures that have been advised and practised for the rectification of this condition. I think that previous to the development and perfection of the Watkins-Wertheim operation, as I have said before, there was no method of which I have cognizance to deal successfully with these unfortunate patients. I have been astonished that so little notice has been taken of this most valuable addition to our planned operations by the various text-books, and that this method has been so neglected by the teaching staff over the country.

I was very much surprised in going over Dr. Watkins' writings to find that he had been doing this operation for such a long time, and that it was given to the profession as early as 1898. This, of course, does not speak well for my study of the literature, but be that as it may, it had escaped my notice until within recent years. It may be that I had practised so many of the different and numerous methods which had been devised and approved, with such uniformly bad results, that I did not attach sufficient importance to Dr. Watkins' publication, and that it did not impress me deeply enough.

I feel that we probably have had an imperfect understanding of the nature and extent of the anatomical defects and structural changes which have existed, and that we have also failed to appreciate the changes in anatomical relationship and the advantages incident thereto which are brought about by this operation. We have attempted to cure a true hernia of the bladder by simply infolding it and covering it over with mucous membranes. Any plan based upon the same principles would be ridiculed if applied to hernia of the gut through any of the potential canals in the body. We have also failed to vary our plan of relief in the individual case and have applied (and still do I think) the same method to practically every case. We must certainly do as Watkins and Mayo have done and group these cases in at least three different classes, modifying our plan in each class. In the child-bearing woman the modification suggested by the originator of the operation has given the best results in my own hands, though we have varied this somewhat by making a lower bladder attachment to the fundus of the uterus and attached the vagina to a lower point upon the anterior wall of the uterus.

In the elderly woman, with the very small atrophic uterus, we believe that the plan suggested by Mayo, which we have carried out a number of times, is the one to be preferred. With the small uterus removed, the broad and round ligaments form a magnificent floor for the bladder, and if the superior portion of the broad ligaments be then sutured to the most anterior point of the vagina and this line of suturing followed down to the base of the ligaments, including the round ligaments in this suture, we have not only an excellent and very superior support for the bladder but also a strong ligamentous support for the vagina itself. The subsequent recurrence of a cystocele, or the subsequent occurrence of an intestinal hernia through the vagina with a coincident prolapse or inversion of the vagina, is neither to be anticipated nor to be feared. We have seen a number of cases where hysterectomy has been done for the cure of cystocele with prolapse, the broad ligaments having been sutured merely into the vault of the vagina and in each one that we have seen there has been not only no improvement of the cystocele but a much worse complication. In the presence of such recurrent conditions it is often a most difficult matter to give these individuals relief by any subsequent operations. Hysterectomy alone without proper vaginoplastics never cured a prolapsus or cystocele, but, on the contrary, as indicated, only makes bad matters worse.

The technic of the operation is doubtless familiar to the Fellows, but to make the paper complete we offer the following very brief description as laid down by the originator of the method.

The patient is prepared in the usual manner, and after being anesthetized (nitrous oxide gas and oxygen) is placed in the lithotomy position. The anterior cervical lip is grasped with volsellum forceps, the anterior vaginal wall separated from uterus through a semilunar incision circumscribing the anterior cervix. The anterior vaginal wall from the cervix to within an inch of the meatus urinarius is then incised in the median line, care being taken to avoid injuring the bladder. With scissors or by blunt gauze dissection the bladder is separated from the vagina extending well out laterally so as to free the entire cystocele, now the uterovesical fold of peritoneum easily recognized as a freely movable layer between the bladder and uterine body, is opened. The peritoneum may be perforated with the finger or grasped with forceps and incised, the opening then dilated sufficiently to permit delivery of the uterus. The uterus is delivered into the vaginal canal by passing the finger over the fundus or broad ligament, or by grasping the fundus with bullet forceps. The anterior wall of the uterus should not be grasped and an attempted delivery through the peritoneal opening made as the diameters of this segment are greater than the fundus and difficulty will ensue. Delivery of the fundus first is easy and presents no trouble. The uterus having been delivered, a suture is now introduced through the vaginal flap near the urethra, then through the uterine body behind the fundus and through the opposite flap at a point corresponding to that of its introduction on the opposite side. The fundus should be drawn sufficiently downward to support the prolapsed bladder wall, but not to press upon the urethra and thus interfere with micturition. This first suture is then tied and the required number of others inserted parallel thereto. The remaining portion of the wound is then closed. Where the cystocele is very large some of the redundant vaginal flap may be excised.

The principles of the operation, as explained by Watkins, are: (1) The bladder is supported by and rests upon the posterior wall of the uterus. (2) The uterus is elevated in the pelvis by being tipped forward, in fact, its position is changed about 180 degrees. The twist in the broad ligaments produced by the changed position of the uterus perceptibly shortens them. (3) The tendency for the uterus and bladder to prolapse following the operation are antagonistic, as any sagging of the bladder increases the anterior displacement of the uterus, and any prolapse of the uterus elevates the bladder wall.

In the completed operation the bladder rests upon the posterior wall of the uterus.

So far as can be ascertained, the only objections which have been urged against the Watkins-Wertheim operation are: (1) Its employment is contraindicated, without certain modifications, during the child-bearing period because of complications which might arise during pregnancy and parturition. This objection, however, seems unimportant since extensive uterine prolapse and cystocele usually occur most frequently after the menopause. (2) The difficult technic incident thereto. This objection also seems untenable as the technic is not as difficult as that incident to other operations sufficiently radical to offer permanent correction of extensive prolapse.

Even in complete uterine prolapse, if the uterus be not seriously diseased, a modified Watkins-Wertheim operation seems preferable to hysterectomy, as the uterus affords ideal support for the prolapsed bladder. "This modification is made by severing a portion of the base of each broad ligament from the cervix and by suture of the free ends of the broad ligaments together in front of the cervix" (Watkins).

In conclusion, we would urge a much wider adoption of this operation, and particularly by those of the Fellows of this Society who have not as yet tried it, if there be such. We would also urge that some effort be made to bring this most excellent procedure for the relief of a most distressing condition to the attention of text-book writers and thus have it placed more generally before the coming generation of surgeons. In our opinion, this operation should be upon just as firm and stable a foundation and should have the same standing as the operation of Bassini for the radical cure of inguinal hernia.

POSTPUERPERAL STERILITY—ITS CAUSE AND SURGICAL TREATMENT.

BY

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Winston-Salem, N. C.

GYNECOLOGY means, not ablation or distortion of organs, but conservation of the procreative functions of womanhood.

The clinical picture of the "group" of cases indicated by the title of this paper is familiar to you all. That it is distinctive and real is true, and also that it offers possibilities for surgical relief I believe can be established. It is most often a sequel to the confinement of primiparæ, but may occur later in the child-bearing period. As a sequence to mild postpartum infection, it resembles in pathology and in results, sequelæ to the exanthemata in early girlhood; the difference being that on the one hand we have a hope of clearance from the marital relations, and on the other this hope has been dispelled.

The patient comes with a chief complaint of "pain;" and pain, mark you, is the distress signal of pathologic foci. We get the history of a "labor" several years ago with no distinctive feature save a "chill" within the limits of the first week of the puerperium. This chill, followed by fever for several hours causes no alarm, and the convalescence, in other respects, seems perfectly normal. The mother after the usual "rest in bed"—which is never long enough—will resume her care of the household, and as a rule, will nurse her babe throughout the allotted time. The menses reappear, but the rhythm is broken, the interval being either too short or too long, with some discomfort amounting to pain during the flow, which is either too scant, or too free; while a moderate leukorrhea just after the menstrual epoch is the rule. In a general way the health is fairly good, and yet not up to normal. The appetite is fitful and the food is not digested well, thus bringing the usual sequence of constipation and loss of weight. The years go by, with no conceptions: while blended with the pain and the clinical picture here portrayed, and in a subconscious way perhaps, is a wonder at such break in the cycle of normal marital relations.

Now let us consider the pain, with its *three distinctive points*, and their meaning; and that we may get a clear conception of conditions we will picture just what happened at the time of confinement. The "chill" was the culmination of a mild infection, for nothing else would cause an explosion of this type; the invasion through just a break, perhaps in the mucous membrane of the outlet, or as likely at the site of placental attachment, traversed the Fallopian tubes and started a conflagration of intrapelvic cellular structures which spent itself and stopped just short of pus possibilities, *but not before singeing their delicate fimbriæ and sealing them to the surface of each ovary*. Thus function is abolished, for the fimbriæ, save when in spasmodic clasp of the ovary, should "float free like a fish's fins in water," and two pain points established by distorted anatomic conditions.

Being a neighboring structure, cushioned in similar cellular tissues, and vitalized by communicating circulatory fluids, the appendix is caught in the conflagration just as the branches of a neighboring tree when a house is burned. Like the fimbriæ of the tubes this "little assassin" with its meso-attachment, is devitalized just to the point of permanent injury, leaving, perhaps, fixation at its base to the head of the cecum with lessening of its lumen quite sufficient to hold any harbored enterolith, or abolish any possible function with which it may be accredited; and giving us the third pain point of so much value in the classic group of physical signs distinctive of this pathology.

Therefore—our physical examination gives us tenderness per vaginam—to the right and to the left of the uterus—while this organ swings free and in a normal position. From above, deep pressure just above the left ovary gives pain though it is not always marked, while on the right we find the usual blend confirming the feel from below of a tender ovary, and also the *reflex epigastric discomfort ever coincident with involvement of the appendix.*

In addition to the three pain points the importance of which I wish to emphasize, the patient will give a history of pelvic discomfort when walking, most marked when coming down a stairway, or stepping off the curbing, and her graphic account of a "pulling sensation" when lying down especially when lying on the left side, the fixation seeming to be in the right lower quadrant, and of such severity as to have prevented her lying on the side for years, and also to prevent sleep; is not only a constant feature in the clinical history just portrayed, but confirmatory of the existing pathology.

Years ago, Lawson Tait and Joseph Price developed the late

pathology of tubes and ovaries, and established the justice of their removal. To-day our chief advances lie in early recognition, and in preventive measures. This condition, the result of infection, will not clear up, time only emphasizing the agglutination of structures and perpetuating the abolition of function. Therefore it only remains to suggest a method promising to relieve symptoms and restore function—this promise comes, I believe, through surgery; and is made possible only by the perfect toilet and precise technique of to-day.

After the usual preparation for an abdominal section the approach may be made through either a free right rectus, or a median incision; preferably median, unless the patient be a thin subject with a shallow pelvis. The appendix is sought and removed, with the freeing of any bands that may favor normal rotation of the cecum. At this juncture the head should be lowered, as free exposure facilitates both investigation and handling of the appendages. Then with the uterine fundus as a starting-point, and tracking down to the right, and to the left, of the pelvis, each Fallopian tube is palpated to its limit; and each, in turn, with its adjacent ovary brought into view. The fimbriæ, if welded to the surface of the ovary, is gently freed, entire, and with very gentle manipulation normal conditions restored to this delicate fringed extremity. If pain *during menstruation* has been marked, suggesting obstruction to normal currents through the Fallopian tube—each fringed extremity may be carefully surrounded by gauze, the ostium abdominal exposed, and a filiform bougie passed through the lumen of the tube to the limit of the uterine cavity, thus freeing any possible occlusion and establishing its patency. Finally, after careful restoration of the appendages to their "home" in the pelvis, the patient is lowered, and a half pint of normal saline solution introduced into the cavity just before closure of the abdominal incision. This last step is important, the solution assuring that the fimbriæ float free for just a little while, until the edges are slightly seared and do not become again agglutinated to the surface of the ovary.

Results, in the few cases in which this procedure has been used (and I have not had occasion to "sound" the Fallopian tubes), have been gratifying. The pain points have disappeared, and the patients walk and lie on either side with comfort. The appetite has returned, and digestion is good, with the resultant gain in weight. While of prime importance is the fact *that menstruation has resumed its normal cycle without discomfort.*

STRANGULATED OVARIAN CYST SIMULATING APPENDICITIS.

BY

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AT the Buffalo Meeting of this Society, one of our members, Dr. K. I. Sanes, presented a paper on "Torsion of Ovarian Cyst," and so completely did he cover the subject, that it would be superfluous for me to repeat anything which he described in his excellent paper at that time.

To-day I wish to take up one phase of abdominal surgery in which torsion of the ovarian cyst figures largely; namely, strangulation of an ovarian cyst simulating appendicitis. That there is a great similarity between these conditions is well known to us surgeons, and reference to our records will prove this assertion. In the earlier days of abdominal surgery, these conditions were more frequently confounded than at the present time. A series of four cases occurring in my own practice, which I diagnosed as acute appendicitis and operated therefor, prompted me to investigate this condition. But, much to my surprise, a search of the literature revealed that very little had been written thereon.

I should like, first, to report briefly the history of these four cases.

CASE I.—Mrs. B., aged forty-six, married, mother of three children. Past history, negative. Two or three days before admittance to the hospital was seized with an excruciating pain in the right side, so much so that she went into a state of collapse and with difficulty was revived. Upon admittance to the hospital, the entire abdomen was rigid and board-like, and it was impossible to make a thoroughly satisfactory physical examination. However, she was more sensitive in the lower right quadrant and in the region of the appendix than elsewhere, and because of this and her menstrual history, which was negative, an incision over the site of the appendix was made. The appendix was found to be somewhat inflamed, but not sufficiently so to give rise to the grave symptoms which she presented. Further search revealed a large necrotic mass occupying the lower part of the pelvis and extending somewhat over toward the median line. A median incision was then made below the umbilicus and there was disclosed a strangulated ovarian cyst, the size of a cocoanut. Cyst

was somewhat adherent to the intestine, but was finally removed, and the patient made an uneventful, though stormy, recovery.

CASE II.—Miss N. H., aged thirty-five, housewife. First seen by me on August 13, 1909, at that time complaining of pain in the abdomen. Family history, negative. Past history, negative, except that she had typhoid fever at eleven years. Has always had considerable pain in the region of the right ovary during menstruation. Last menstruation ended August 13, 1909. On August 13th felt nauseated. The next morning, following movement of bowels, had severe pain throughout abdomen, and compelled to go to bed. Pain increased until Aug. 15th, when it became easier. Abdomen greatly distended. Gradually improved. When she entered the hospital on August 20th, distension was very marked, little pain but evidently had a general peritonitis. She had been flowing the previous day (the 19th) and this continued.

When seen by me this patient had already been ill two days, and her abdomen being very tense all over, especially in the right side, where it also was more tender, caused me to make the diagnosis of a ruptured appendix. As she had a weak heart and was in no condition for an operation, I advised putting her upon a modified Ochsner treatment, and awaiting developments. She gradually improved and was brought to the hospital a week after the commencement of her attack.

She was prepared in the usual way for an appendectomy. Upon opening the abdomen, however, a dark necrotic mass about the size of a child's head presented itself, and upon investigation this was found to be a gangrenous ovarian cyst, caused by the pedicle becoming twisted upon itself. The appendix was somewhat inflamed, but only secondarily, and was not responsible in any way for the symptoms found at my first examination. Patient was treated in the usual manner and made a slow, but fair, recovery.

CASE III.—Miss A. C., aged nine, school girl, admitted to the Child's Ward of the Albany Hospital, September 10, 1910. Family history, negative. Past history, negative. Present illness, one year ago had an attack of "stomach trouble," with pain in abdomen, and vomiting. Three days before entering hospital, patient had a severe attack of abdominal pain, with vomiting. Examination of her abdomen at the hospital revealed marked distention and rigidity, with marked tenderness under McBurney's point. Patient constipated and tongue coated with grayish film. Pulse upon entering hospital 94 and temperature 99. Owing to her previous history, together with marked distention and rigidity, and the pain over McBurney's point, diagnosis of a gangrenous appendix was made and operation advised.

The usual appendicular incision was made, but upon entering the abdomen, an ovarian cyst the size of a grapefruit was encountered, which was gangrenous. This gangrenous condition was caused by the twisting of the pedicle of the cyst. The appendix was secondarily involved, but had not reached the stage which would cause the symptoms which she exhibited.

CASE IV.—Mrs. L., aged twenty-six, married about a year. Past history, negative. Menstrual history, absolutely normal. Two weeks previous to attack was delivered of a fine baby boy. Convalescence uneventful for a period of seven days, then temperature began gradually to rise (102.2), pulse to increase (110) and pain suddenly appeared in the lower right quadrant of the abdomen. The lochia, in the meanwhile, which from the beginning had been normal, showed no increase, no foul odor, and the uterus was not soft and boggy.

Bimanual examination was practically negative, though she was much more tender on the right side than on the left. Rectal examination was negative. Physical examination was negative, except in the lower right quadrant of the abdomen, which gave the characteristic board-like sensation of an acute appendicitis, but for the fact that it was rather low down for an appendix and a little too far toward the median line.

At operation, usual incision for the removal of appendix was made. Appendix was found to be in practically a normal condition. A little further search revealed an ovarian cyst the size of a hen's egg, well back toward the culdesac of Douglas, with a fairly long pedicle, which had become twisted and strangulated. Cyst removed and patient made an uneventful recovery.

In studying the histories of these cases, we glean some very interesting facts. They all complained of gastric disturbances; that is, all four had attacks of what seemed to be, and undoubtedly was, appendicitis. In two of these cases there was more or less disturbances of menstruation, though not of enough importance to particularly attract attention to it. In all four cases there was no suspicion of a tumor present before the operation.

Cases I and II are similar in character, because they occurred in women about the age when the menopause might be expected to be approaching. Upon entrance to the hospital both presented symptoms of general peritonitis, their abdomens being so rigid that it was impossible to make a thoroughly satisfactory physical examination in either case. Each was more rigid and tender in the right iliac region directly above the appendix, and vaginal and rectal examination were negative. They also displayed other symptoms of acute appendicitis—nausea, vomiting, and constipation.

Case III was not so severe, and all the symptoms were confined to the right iliac region, the rest of the abdomen being practically normal. Of course, we could obtain no menstrual history of this case and could make no vaginal examination, which might have aided us in our diagnosis. Rectal examination was thought unnecessary at the time.

Case IV, the attack occurred shortly after childbirth. This

case did not have all the earmarks of a regular appendicitis, but that diagnosis was made in lieu of any more definite symptoms appearing. The rigidity in this case was also confined to the right iliac region.

All of us are, of course, familiar with acute appendicitis and gangrenous ovarian cyst. Therefore we may pass over the matter of diagnosis of these two conditions, and discuss the more difficult step of differential diagnosis. In our differential diagnosis we have to depend more upon the clinical history than upon the physical examination, for the following reasons:

The board-like rigidity prevents our gaining anything from palpation or percussion. (These cases do not come to us until after peritoneal irritation has set in.)

Board-like rigidity is very common in all other abdominal conditions.

Almost all of the acute conditions occur on the right side.

Vaginal examination, while it may reveal a mass in the culdesac of Douglas, does not enable us to say that it is a cyst. This is also true of rectal examination.

On the other hand, clinical history shows that this attack occurs at the time of puberty or menopause or subsequent to unusual or violent exercise, such as that of labor in childbirth, etc. If we have such a clinical history, together with but very slightly elevated pulse and temperature, we should be on the alert for twisted ovarian cyst.

If opportunity were given to examine these cases immediately after the onset of the attack, and before peritoneal irritation had set in, it would no doubt have been possible to detect a tumor mass and a correct diagnosis made.

Following out this thought, the possibility of a floating kidney with a kinked ureter, simulating ovarian cyst, is likely, but here a careful examination of the urine will establish the diagnosis. Also in the kidney condition, the pain, etc., are found higher up and somewhat toward the back.

Thus, when the case comes to us for diagnosis, we are handicapped by the lack of assistance which palpation and percussion afford ordinarily. Deprived of these two important aids in diagnosis, we are compelled to rely almost entirely upon the clinical history.

In conclusion, then, let me say that strangulated ovarian cyst is rather common, simulating acute appendicitis in the majority of cases; that when we encounter the case of a patient approaching the menopause, or puberty, or one who shortly before has been delivered

of a child, we should consider, not only acute appendicitis, but twisted ovarian cyst as well.

Based upon my experience, I am of the opinion that it is absolutely impossible to make a differential diagnosis between these two cases, unless the case is seen early enough for one to make a thorough physical examination—at least, that was my experience in these four cases. Each had been sick for from three to four days before entering my service at the hospital, and consequently the physical findings were practically nil. But a complete and reliable clinical history of these cases would have been of great assistance to me.

The prognosis and treatment are combined in the one sentence: The earlier the diagnosis, the earlier the operation, the better the prognosis. Differential diagnosis is made difficult—often impossible—by the failure of the general practitioner to call the surgeon soon enough.

This also is to be considered in regard to the severe pain and collapse which present: When it occurs in a perforation of the appendix very few patients react, but die within 24 or 48 hours, while a similar pain in the same location, apparently equally as severe, producing a like collapse, in twisted ovarian pedicle a great majority will recover from the shock, living on for quite a long time, as the history of these cases indicates. This gangrenous condition of the cyst is not infective and the system tolerates this pathological condition for quite a long period. Therefore, when patients improve after such acute symptoms, my faith in my original diagnosis—perforative appendicitis—is modified when they go on to improvement, although having the symptoms of general peritonitis present.

DIGITAL ROTATION IN OCCIPITOPOSTERIOR POSITIONS OF THE VERTEX.

BY

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(With seven illustrations.)

Introduction.—The art of obstetrics may be said to date back to the beginning of the human race, yet it did not develop as a science of record until about the 14th century; but since then so much has been written and published on this subject, that it would seem that but little remains to be said, particularly with regard to the mechanism and conduct of labor. However, after an extensive and careful review of the literature bearing upon the methods of applying digital or manual rotation of the vertex in occipitoposterior positions, one finds that the description of the technic employed is meager in the extreme; also that the sutures of the fetal head may be employed is mentioned only to point out the futility of attempting to make use of them for the purpose of performing rotation.

It is estimated that of all vertex presentations, 17 per cent. are occipitoposterior positions; although it is likely that many cases pass unrecognized, because of the fact that spontaneous rotation will ultimately occur in all but about 4 per cent. of them.

If we follow the teachings of the modern school of midwifery, we limit the duration of the second stage of labor, in order to avoid injury to the fetus from prolonged pressure upon its head. For the same reason the maternal parts should be protected from serious injury. Therefore, it is not always expedient to await the spontaneous anterior rotation of the occiput even when we have the knowledge that it will eventually occur.

The *probable* diagnosis of an occipitoposterior position of the vertex is ofttimes made by the failure of the labor to progress after the second stage of labor has been reached; its existence may be substantiated by abdominal palpation. Noting the absence of the rounded mass formed by the back of the fetus to either side

of the median line anteriorly, the feebleness or total absence of the fetal heart sounds in these regions, or with their presence well out either side of the abdomen, all of which will serve to confirm the presumptive diagnosis; but the *positive* diagnosis of this position, as of any other, can be made only by the recognition of the landmarks on the fetal head. Here it might be well to define these landmarks, since their indentication is so essential for a positive diagnosis.

Landmarks.—The most important landmarks of the fetal skull are the sutures formed by the junction of the occipital, the two parietal and the frontal bones (see Fig. 1). They are respectively the lambdoidal, which is the suture between the occipital and parietal bones; the sagittal, which unites the parietal bones; the coronal, which is formed by the junction of the two halves of the frontal bone; and the frontal, which is the cleft between the two halves of the frontal bone. The posterior fontanelle is at the junction of the lambdoid

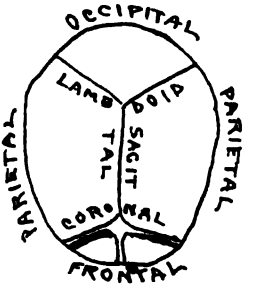

FIG. 1.

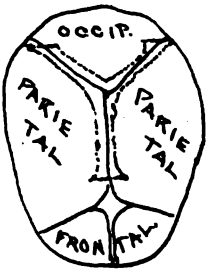

FIG. 2.

and sagittal sutures, and the anterior fontanelle is at the junction of the sagittal, the coronal and the frontal sutures. The ears, the root of the nose and the orbital arches also form additional and useful landmarks.

Diagnosis.—The positive diagnosis of the position of the head in vertex presentations is thus made by digital palpation of the landmarks on the fetal head, the most accessible of which are the sutures and the fontanelles; their locality and the relation of the head to the pelvis of the mother, will determine the *position* of the vertex. The landmarks of the mother's pelvis need not be considered in this connection. The location of the landmarks on the fetal head is the essential point and determines the position of the vertex and its relation to the pelvis.

During the first stage of labor, when the os is imperfectly dilated and when the vertex is smooth and slippery, a *positive* diagnosis by

digital palpation of the sutures and fontanelles is exceedingly difficult, if not impossible; while by abdominal palpation and auscultation, a *probable* diagnosis may be readily made. In the second stage of labor, when the cervix is fully dilated or dilatable, and the head is engaged, a *positive* diagnosis of an occipitoposterior position usually can be made. The head once fixed in the brim, the sutures are no longer smooth and indefinite because the pressure to which the head is subjected, particularly during a uterine contraction, causes the cranial bones to overlap each other, and thus the sutures are rendered prominent and more readily palpable. In this overlapping the parietal bones regularly override the occipital and frontal bones and the parietal bone which presents anterieorly will overlap its fellow.

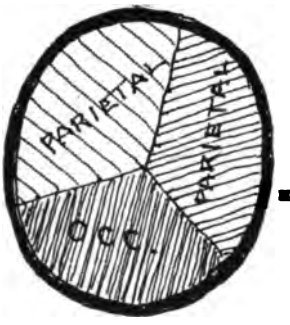

FIG. 3.

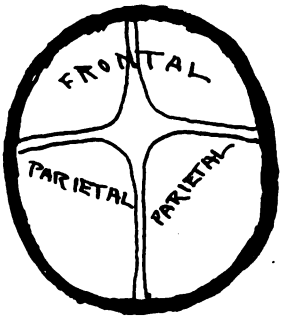

FIG. 4.

If, at this time, we view the lambdoid and sagittal sutures together, the relations between them resemble the letter "Y" (see Fig. 2), the two arms of the "Y" being formed by the lambdoid, and the stem by the sagittal suture. We also find that the portion of the skull between the two arms of the "Y" is the occipital bone and that the stem is formed by the junction of the parietal bones. Close observation, as to the manner in which overlapping occurs, shows that the one which occupies the lowest plane (in other words, the bone that is the most depressed) is the occipital bone; and the one that is the least depressed is the anterior parietal bone; if the stem of the "Y" be palpated in the direction of the frotal bone, it will terminate in the anterior fontanelle.

The confusion that sometimes arises when all the sutures of the posterior fontanelle appear to radiate from a central point within the dilated cervix (see Fig. 3) may be cleared away when it is remembered that an examination during a uterine contraction will disclose the occipital bone as the one most depressed.

The most favorable time to diagnosticate the position of a vertex presentation is immediately after the rupture of the membranes. Prior to that, each uterine contraction is accompanied by a bulging of the bag of waters over the sutures which renders palpation of them difficult, to say the least. Delay in labor following rupture of the membranes, favors the formation of a caput succedaneum which will prevent palpation of the sutures. An extensive caput succedaneum is not infrequent in occipitoposterior positions of the vertex

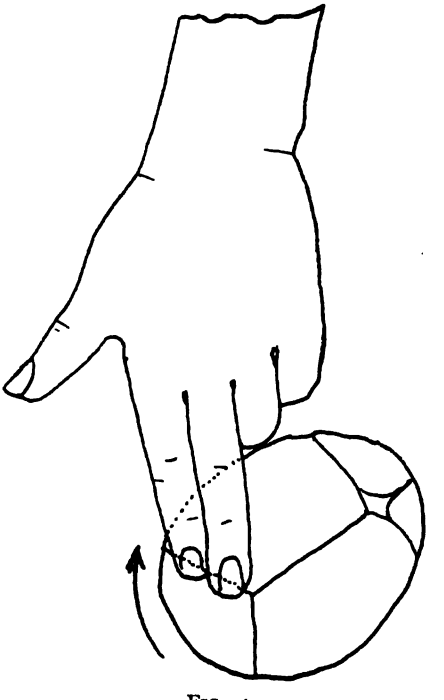

FIG. 5.

because of the prolonged second stage of labor. However, palpation of the sutures beyond the boundary of the caput succedaneum will mark their location, and continued pressure with the finger on the edematous scalp will not only enable one to follow the sutures throughout their course but to determine which bone is the most depressed. A correct diagnosis may thus be made.

An incomplete flexion of the vertex, in cases of occipitoposterior positions may approach a brow presentation. This is not infrequent but it is a condition that belongs to the early part of the second stage of labor. It may occur also if the head is retarded and

extension follows flexion during the second stage of labor. If this takes place, the anterior fontanelle is then substituted for the posterior (see Fig. 4). We now find the depressed occipital bone if we follow the suture that points most directly backward; or if we follow the suture running in the opposite direction, the finger will come in contact with the bridge of the nose and the orbital arches may be felt on either side of it. As a last resort, the finger may be passed to and fro over the ear of either side. The finger passes

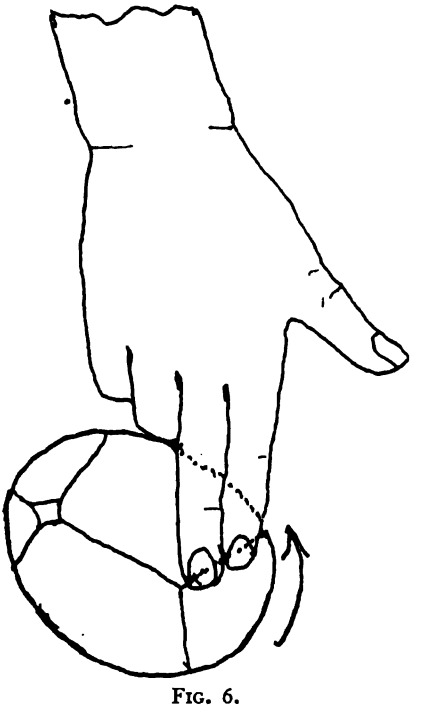

FIG. 6.

readily over the ear in moving *toward* the occiput but it encounters resistance in passing from the occiput.

Rotation.—As the diagnosis is made, the anterior arm of the lambdoid suture will be found to be the most prominent of the three parts of the letter "Y," because of overlapping of the anterior parietal bone, which, in turn, overlaps its fellow. If the occiput is to the right and posterior, it may be advantageous to use the left index or middle finger, or both, and with the palmar surface hook, as it were, onto the bony ledge of the anterior arm of the lambdoid suture and endeavor to move it upward or forward in the direction

in which the occiput should rotate (see Fig. 5). The amount of force that may be applied to the head in this maneuver is executed during a contraction of the uterus. At that moment there is a tendency for the head to yield to the rotating pressure exerted by the fingers. If the occiput be to the left and posterior the same fingers of the right hand should be used for this manuever (see Fig. 6).

Rotation, when it occurs, is gradual and may be very slow. Almost invariably it means a prolonged second stage of labor.

FIG. 7.

Anterior rotation of the occiput is, as a rule, accomplished after it has reached the pelvic floor. The pelvic floor constitutes the opposing force from below which the descending head must overcome; it is the condition which brings about spontaneous anterior rotation of the occiput.

It is rare to find the occiput directly posterior associated with the embarrassing condition which does not enable us to determine in which direction rotation should be attempted; but should

this condition arise, tentative efforts at rotation may be undertaken to ascertain in which direction the head is apt to yield to the pressure made upon it by the fingers. This maneuver should always be preceded by abdominal palpation and auscultation in an endeavor to ascertain the exact attitude of the fetus in the uterus.

Failure at digital rotation does not involve an experiment that is costly. Not only the mother and child, but also the operator, will reap the benefit of the exacting diagnosis which this maneuver requires.

If forceps rotation and extraction are resorted to, the lambdoidal suture will be the operator's guide; the manuever employed for digital rotation may be successfully used for maintaining the rotation secured by the forceps, during the time the instruments are removed and reapplied.

When the anterior fontanelle presents, through incomplete flexion of the head, the middle finger of the examining hand may be moved backward along the sagittal suture till the beginning of the diverging lambdoidal arms are felt and the depressed occiput is reached; the palmar surface of the finger tip is then hooked into this depression, or notch, at this point and traction in the direction of the sagittal suture is made during uterine contraction (see Fig. 7). At the same time the frontal bone is pressed upward with the thumb of the operating hand. When flexion of the head is complete, the anterior fontanelle will have moved forward and the occiput will have been brought more nearly into the position occupied by the former. From this stage on, digital rotation of the occiput may be accomplished by the maneuver described above.

Some writers in commenting upon the efforts made to assist in the anterior rotation of occipitoposterior positions claim that the operator in these cases is only giving himself credit for something that would, probably, have occurred spontaneously. Be that as it may, those who observe the rotation of the occiput after resorting to the manipulations mentioned, may have the pleasure of witnessing an early termination of what otherwise would have been a much prolonged second stage of labor.

Summary and Conclusions.—1. The positive diagnosis of position is essential and is best made at the beginning of the second stage of labor, immediately after the rupture of the membranes and during uterine contraction.

2. Attempts at digital rotation before the vertex is engaged in the pelvis will usually result in failure because of the absence of conditions necessary for its success.

3. The application of digital rotation in occipitoposterior positions is most effective when made during uterine contractions and after the occiput impinges upon the floor of the pelvis.

4. Rotation should be gradual; the effort may have to be continued through several uterine contractions before the occiput remains fixed anteriorly.

5. Occasionally the occiput appears to be more freely movable when the uterus is relaxed; but, at this time, the fingers cannot assert their full power at rotation, because of the tendency to slip off of the bony ledge through upward displacement of the vertex.

6. After rotation, time for remoulding of the head should be allowed in order to secure the lesser diameters of it for delivery.

7. Digital rotation, in conjunction with the use of the forceps, is of assistance. By this procedure the rotation obtained by the forceps may be maintained during their removal and reapplication.

8. No risk to mother or child is incurred through failure of attempts at digital rotation.

REFERENCES.

1. Brodhead, AMER. JOUR. OF OBST., 1900, vol. xlii, p. 806.
2. Dickinson. *American Medicine*, Sept. 7, 1901.
3. Voorhees. *Medical News*, June 4, 1904.
4. Marx and Polak. *Medical Record*, July 9, 1904.
5. O'Brien. *Medical Record*, August 25, 1906.
6. Harrar. *Bull. Lying-In Hospital*, March, 1907, p. 70.
7. Michaelis. *N. Y. Medical Journal*, March 28, 1908.
8. Kerr. Operative Midwifery, 1908, p. 30 (Wm. Wood).
9. Knapp. *Bull. Lying-In Hospital*, September, 1908.
10. Dupres. *Paris Thesis*, 1909–10, No. 56.
11. Robbinowitz. *N. Y. Medical Journal*, December 9, 1911.
12. Rice, AMER. JOUR. OF OBST., 1912, vol. lxvi, p. 232.
13. De Lee, Principles and Practice of Obstetrics, 1913, p. 930.
14. Cragin. Practice of Obstetrics, 1916, p. 277.

OBSERVATIONS ON PREMATURE SEPARATION OF THE NORMALLY SITUATED PLACENTA IN THE LATTER MONTHS OF PREGNANCY.

BY

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New York.

THIS accident has been recognized and differentiated for more than a century, but only within very recent years have the frequency and dangers been generally appreciated.

Premature separation of the normally situated placenta vies with placenta previa in clinical importance. In the last 60,000 histories at the Lying-In Hospital there are recorded 164 cases of premature separation of the placenta, or one in 336. In the same series placenta previa is recorded 368 times, or one in 163.

In a recent and comprehensive article, Professor Williams traces the development of our modern knowledge of this subject, and leaves the subject where little new can be advanced at present, except perhaps the discussion of certain phases of the accident.

During the past thirteen months the writer has had five cases of this accident under his personal care in the service of Dr. A. B. Davis. In one instance the condition occurred twice in the same patient. As this group of cases illustrates several clinical types, the writer begs to present the histories as an introduction to a discussion of some phases of this interesting and dangerous condition.

CASE I.—Mrs. S., No. 31700, aged thirty-four, para-vi; strong large framed Irish woman; at, or very near term; good health; no abnormal symptoms during her pregnancy. In the afternoon of the day before her admission to the hospital, one of her children was severely injured in the street and the patient, who lived in a top floor tenement, ran up and down stairs a number of times. About midnight she began to have severe and steady pain in the abdomen and back. They were not like labor pains. The pain continued during the night, and at nine o'clock in the morning the patient suddenly passed a large blood coagulum and a considerable quantity of fluid blood. About an hour later there was a second gush of free blood and coagula. A physician was called, and the patient brought to the hospital shortly after. On admission, the patient was bleeding considerably. Her condition was poor, the uterus very large, *the fundus measured* 44 *cm.* above the symphysis, and the uterine consistency was very firm. The os admitted three fingers and the membranes were intact. The vertex presented, but was only partly engaged in the brim; fetal heart not audible.

The patient was delivered by version as quickly as possible. The child appeared to be full-term, and had been dead for some hours. The cord was around the body and under one arm. The placenta was almost completely detached and surrounded by a large amount of clot. The large uterus had little or no contractile power, and the patient died in a few minutes from hemorrhage and shock.

No autopsy was made, but a postmortem exploration of the uterus revealed a distended and relaxed cavity. Firm intrauterine gauze packing had had little or no effect in promoting contraction of the organ.

This case represents a frequent type: Multiparæ, usually with a history of three or more pregnancies, relaxed tissues, and a history of overexertion or slight trauma. The onset of the development of a retroplacental hemorrhage is marked by pain in the abdomen and back, symptoms of shock to a greater or lesser degree, and tonic contraction of the uterus.

It will be noted that in this case nine hours elapsed between the first symptoms of retroplacental hemorrhage and the appearance of blood externally. The lack of contractile power of the uterus after delivery of the child, as observed here, is a frequent complication in cases in which the retroplacental hemorrhage does not find a ready outlet, and infiltration of the uterine muscle results in impaired contractile power of the organ.

CASE II.—Mrs. T., No. 31846, aged thirty-six, para-ix; a rather obese Irish washerwoman of the hardworking type. She was at the beginning of the last month of pregnancy and had felt well until the evening before her admission to the hospital, 12:30 A. M. During the two preceding days she had been doing very heavy washing. On the evening of her admission she began to have pains in the abdomen and back, and believed herself to be in labor. An examination showed the cervix obliterated, the os slightly dilated, the membranes intact, and breech presenting. The uterus was tonically contracted, and very tender to the touch. The patient complained of constant pain in the uterus and severe headache. The fetal heart could be distinctly heard. General condition of the patient good. Four hours after admission external bleeding began, chiefly in small dark clots. Cervical dilatation was slow; the patient's general condition and the fetal heart remained good. During the following six hours external bleeding was very little, and the condition of mother and child did not suffer. At the end of this period, however, the patient had a sudden and profuse hemorrhage.

The os now admitted four fingers. The membranes, which were still intact, were ruptured with the intention of delivering the child at once, but, immediately after the rupture of the membranes the uterus contracted promptly and the child was born spontaneously except for the usual manipulations in delivering the after-coming

head. The placenta and a large quantity of dark coagula followed the expulsion of the child. The uterus contracted normally, and there was no excessive postpartum bleeding. The puerperium was uneventful. The child, which weighed 2300 gm. at birth, died on the second day. The autopsy diagnosis was atelectasis. It is evident that in this case the placental separation was not very extensive shortly before the termination of the labor. The placenta became suddenly and almost completely detached just about the time the membranes were ruptured.

CASE III.—Mrs. D., No. 31837, aged twenty-two, para-i; Austrian Jewess, medium stature and good health; four to six weeks from term. Twenty-two hours before admission to the hospital, she fell heavily against the rim of the bath tub, striking her abdomen and left forearm. This was followed at once by discomfort in the abdomen, which grew worse and in three or four hours the patient was having severe abdominal pain with cramp-like exacerbations and severe backache. The pain continued and six hours later, or ten hours from the time of the fall, she began to bleed from the vagina; the bleeding was not profuse, but continuous. When brought to the hospital, twenty-two hours after the accident, she was nearly exsanguinated, and mildly delirious. There was still slight bleeding from the vagina. Examination showed an unobliterated cervix barely admitted one finger; placenta could not be felt. The size of the uterus indicated an eight months pregnancy and was tonically contracted. Fetal heart inaudible. A small vagina and unobliterated cervix determined the decision of making an abdominal hysterotomy, in spite of the fact that there was no evidence of fetal life.

The blood count on admission showed red cells, 2,210,000; white cells, 13,200; polymorphonuclears, 80 per cent.; hemoglobin, 33 per cent. Just before the operation was started, an intravenous saline infusion was begun, and 0.75 c.c. of pituitrin, m. 25 of ergotol and 1/8 grain of morphin were given at the same time. Ether anesthesia was continued during the operation; the amount of ether required was small. The uterus was found firmly contracted, somewhat distended and of a deep purplish red color showing numerous petechial areas. The broad ligaments, tubes and ovaries were not examined. There was no free blood in the peritoneal cavity. After opening the uterus the placenta was found almost completely separated in the region of the fundus. The dead fetus, placenta and membranes, and a great quantity of coagulated blood were quickly removed, and the uterine incision closed. The uterine musculature seemed softer than usual, deeper in color, and infiltrated with blood. The uterine wound scarcely bled. The womb contracted well. After the operation the patient received a stimulating enema and was returned to bed. The child weighed 1890 gm., bore the evidence of having been dead for some time. The round placenta measured 16 by 16 cm., and the detached surface was almost entirely covered with loosely adherent blood coagula. The patient rallied from the operation in twelve hours. She was very weak the following day, and slightly delirious.

Blood examination twenty-four hours after operation showed: Red cells, 1,500,000; white cells, 14,800; polymorphonuclears, 87 per cent. and hemoglobin 25 per cent. A Lindemann blood transfusion of 520 c.c. was made twenty-four hours after operation. Considerable improvement in the patient's condition followed this procedure. Blood examination twenty hours later showed: Red cells, 3,000,000; white cells, 17,200; polymorphonuclears, 85 per cent., and hemoglobin 42 per cent. The patient continued to improve, although the blood picture did not show much change, except that the total and differential leukocyte counts became normal. After six days, both the red cell count and hemoglobin began to increase. The temperature was normal on the fifth day, and remained so thereafter. The highest temperature recorded was 101°. The abdominal incision healed by first intention. Involution of the uterus proceeded normally. The lochia had practically ceased on the tenth day, and the patient was discharged three weeks after the operation. The subsequent history of this patient is:

CASE IV.—About four months after leaving the hospital this patient, Mrs. D., again became pregnant. Except for minor digestive disturbances during the early months the pregnancy progressed normally. At the end of the seventh month, she went to bed feeling perfectly well. At five o'clock in the morning she was awakened by pain in the abdomen which soon became very severe and caused her to faint. She was brought to the hospital soon afterward with all the symptoms of severe internal hemorrhage. The uterus was tonically contracted. Extensive dulness on percussion in both flanks indicated the presence of considerable free fluid in the peritoneal cavity. A small amount of blood issued from the undilated cervix.

Hysterotomy was performed immediately. The abdomen was opened through the former incision. Exposure of the uterus showed that the former uterine incision had ruptured in its entire length. The placenta protruded through the rent. The membranes were unruptured. A seven months fetus, placenta and membranes, were promptly delivered.

The uterine scar was excised and fresh edges sutured in layers with chromic catgut. The uterus contracted well. A part of the partially clotted blood in the abdominal cavity was removed and the abdominal incision closed after excising most of the cicatrix of the previous incision.

The patient made a good recovery and was discharged in good condition on the twenty-third day. Involution of the uterus was well advanced and the organ free from tenderness and adhesions.

Examination of the placenta immediately after the operation revealed the following interesting condition: Shape oval; measurements, 14 × 17 cm.; in the center of its maternal surface was a dark, adherent blood clot 7 × 8 cm. in area and 1 to 2 cm. in thickness. This coagulum was sharply defined and was the product of the retroplacental hemorrhage which occurred before rupture of the uterus took place.

Inspection of the excised uterine scar showed it to be thin in several places; the rest was ½ to 1 cm. in thickness. Sections made from various parts, and examined microscopically, show good fibromuscular structure free from deep penetration of the decidua.

Findley, in a recent article on rupture of the uterus in Cesareanized women, speaks of the weakening effect placental implantation has upon the scar. In the above case, however, it appears that cicatrization was fairly firm and, as the patient had no labor pains to put a strain upon it, another explanation must be sought to account for the early rupture. To me it seems that the increased intrauterine pressure due to the retroplacental hemorrhage, is responsible for the accident.

Case V.—Mrs. Z., No. 31831, aged twenty-seven, para-i; Austrian Jewess, small stature; within two or three weeks of term. About fifteen hours before coming to the hospital she began to have pain in the back and believed herself to be in labor. Seven hours before admission she noticed slight bleeding from the vagina and which later became more copious. A physician was called who packed the vagina with iodoform gauze. He suspected placenta previa, and referred the patient to the hospital.

On admission her condition was fairly good, though she showed evidence of loss of blood. Pulse fluctuated between 100 and 110. The fetal heart was heard in the left lower quadrant and beat 140 per minute. The uterus was very hard and remained tonically contracted. The cervix, unobliterated and thick, barely admitted one finger. Placenta not palpable. Labor pains every four or five minutes. A small amount of fluid mixed with small coagula of blood escaped continually from the cervix; the flow increases with each uterine contraction. The uterus did not relax much between contractions, and was very tender to the touch. The patient complained of constant and severe backache.

Presentation, vertex; head above the brim. The patient, small in stature, had a flat justominor pelvis of moderate degree. The true conjugate was estimated at 8.5 cm. When uterine contraction occurred the head did not come into the brim, but moved laterally in the direction of the left iliac fossa. The small pelvis, however, did not seem sufficient to explain the failure of the vertex to engage in the pelvic inlet. The child was obviously small, and the menstrual history brought the duration of pregnancy within two to three weeks of term. Watching the patient for a time it seemed that the bleeding, the tonic uterus, and the peculiar movement of the child with each contraction, could only be explained by some entanglement of the cord, and partial separation of the placenta.

Abdominal Cesarean section was elected as the quickest and most satisfactory method of dealing with the situation. The uterus was found normal in color and appearance. The child was promptly delivered. Two coils of cord about the neck of the child had held the neck and head close to the lower border of the placenta

in such a fashion as to pull the edge of the placenta away from the uterine wall. The placenta was found attached to the left lateral uterine wall. The cord insertion was marginal at the lower edge of the placenta.

Subsequent examination of the placenta showed that it was oval, measured 14 × 17 cm.; placental separation extended over one-quarter of its area and occurred at the lower margin where the cord was attached. The cord was 43 cm. long. The child weighed 2690 gm.; it did well, and when discharged with the mother on the twelfth day, it weighed 2750 gm.

The puerperium was very satisfactory; temperature was normal on the second day and remained so to the end. Although some retroplacental hemorrhage had taken place for sixteen hours, the uterus was normal in color and appearance. This fact may be explained by considering the area of placental separation, which was low down, and permitted the blood to readily find an external outlet, thus minimizing its tendency to infiltrate the uterine musculature.

Discussion.—There are various generally recognized factors in the etiology of premature separation of the normally situated placenta, among the most important of which are toxemia, trauma, short cord or long cord rendered relatively short when wrapped about the neck or body of the fetus, overexertion, local disease, and the normal retrograde processes appearing toward the latter part of gestation. There is little in the known etiology which might enable us to guard against the accident.

Mechanism of the Condition.—When under the influence of any one of the causes mentioned a slight separation of the normally implanted placenta occurs, the space created thereby between the placenta and the uterine wall will be filled up by blood from the mouths of the uterine veseels opening directly into this retroplacental cavity.

I beg to digress at this point into the realm of applied physics, and describe an hydraulic press. This is a press operated by the pressure of a liquid, under the action either of gravity or of some mechanical device, as a force pump. It depends on the law of hydrostatics that any pressure upon a body of water is distributed equally in all directions throughout the whole mass, whatever its shape. In the more common forms the pressure of a piston upon a body of water in a cylinder of small area is distributed through pipes or openings to a piston of larger area, the statical force being thus multiplied in the direct ratio of the areas of the pistons. Thus, if the diameter of the small piston, A, Fig. 1, is one inch and of the larger piston, C, Fig. 1, in cylinder B, is one foot, the area of C will be 144 times that of A; and if a load of one ton is applied to A, C will exert an upward statical force of 144 tons.

Suppose that the aggregate area of the mouths of the vessels opening into the region of retroplacental separation equals 1 square inch, and the blood pressure therein is 120 mm. of Hg., and suppose, for example, that the area of placental separation is four inches square, giving sixteen square inches, and this area occupied by fluid or semifluid blood, by the laws of hydrostatics, a pressure of 120 mm. of Hg. in a 1 square inch source would yield over this sixteen square inch area a thrust or jacking force of 16 × 120, or 1920 mm. of Hg. If the membranes be unruptured, this force will be transmitted equally to all parts of the uterus.

The statement has been made repeatedly that the retroplacental hemorrhage acts as a foreign body, and thereby stimulates the contraction of the organ. In view of the mechanical principles involved, I believe this view to be erroneous, and that the tonic contraction of the uterus constantly observed in this accident represents a mighty and prolonged effort on the part of the uterus to resist a disrupting force within it. An appreciation of the degree of that force makes it easy to understand the infiltrated and disorganized state of the uterus and even of the other pelvic structures so frequently observed and reported in cases in which the hemorrhage remained "concealed" for any prolonged period. The sooner the hemorrhage secures an external outlet, the sooner will the disrupting force within the uterus be reduced or minimized.

In Case V, where the lower edge of the placenta was separated by traction on a cord inserted at the margin of the placenta, no infiltration of the uterine tissue was observed when Cesarean section was performed, although retroplacental hemorrhage had been going on for sixteen hours. In this case the blood escaped readily from the uterus, and no great disruptive force was developed within the uterus.

In Case III, in which the patient fell in the bath tub, the retroplacental hemorrhage remained "concealed" for ten hours, and after that only a partial external outlet was established. In this case the uterus was markedly infiltrated, although the organ did contract satisfactorily after the Cesarean operation. In the subsequent history of this case, a fairly firm Cesarean cicatrix ruptured within two hours after the onset of a retroplacental hemorrhage from increasing intrauterine pressure.

In Case I, delivered by version, the retroplacental hemorrhage was "concealed" for nine hours; the contractile power of the organ was so diminished by the consequent overdistention of the uterus that the patient's death must be attributed chiefly to this condition. An important point here is the mechanics of this condition. A

matter of repeated clinical observation also is the fact that, when the retroplacental hemorrhage develops before the onset of labor, there is little or no tendency toward dilatation of the lower uterine segment. These patients rarely deliver themselves, unless labor is well started before the retroplacental hemorrhage begins. A thorough appreciation of this fact would save the life of many parturient women. We have ample grounds then to consider every patient, the victim of this accident before the onset of labor or early in labor, one of internal hemorrhage, pure and simple, and to treat the case accordingly. The expectant treatment in ruptured ectopic gestation has been abandoned; cases of ablatio placentæ, with the exception of those developing when the patient is in active labor, might well be placed in the same category.

Diagnosis.—The physical signs and symptoms of this accident are very definite. The hard unrelaxing uterus is characteristic; it is present and persistent from the onset whether the hemorrhage is concealed or not. Pain in the uterus and severe backache, accompanied by more or less shock, are pathognomonic symptoms. Placenta previa and spontaneous rupture of the uterus are the only conditions with which ablatio placentæ might be confused. Differentiation is not, as a rule, very difficult.

BIBLIOGRAPHY.

Williams. Premature Separation of the Normally Implanted Placenta. *Surgery, Gynecology and Obstetrics*, November, 1915, vol. xxi, No. 5, p. 541.

Knight. Hydraulics. Century Dictionary, 1914 Edition, vol. iii, p. 2933.

Findley. Rupture of the Scar of a Previous Cesarean Section. AMER. JOUR. OF OBST. September, 1916, vol. lxxiv, No. 465, p. 411.

IN MEMORIAM.

AP MORGAN VANCE, M. D., F. A. C. S.

BY

LOUIS FRANK, M. D., F. A. C. S.,

Louisville, Ky.

"PEACE TO HIS ASHES." So read the records and the passerby murmurs "Peace to his ashes," goes on his way, ignorant that here lies a great surgeon, one of Nature's noblemen. Born May 24, 1854. Died December 9, 1915.

It is meet and fitting that this Society, at its annual meeting set aside an hour for a word about its dead; that it commemorate the deeds (and they are many and great) of those who in the year gone by have gone before—needless for me to remind you gentlemen that we are co-workers in the greatest profession, one which from its very character teaches modesty, self obliteration and shuns the bright light of public attention. Is it not then well that we should pause and sing praise, not to the living, but to the dead? Is it not then proper that we should fire a salute and sound taps? I think it is a custom to be encouraged and fostered and we should feel proud not "to bury our Caesars but to praise" them. To me has been allotted the task of writing a memorial of one of my colleagues and if in this address I do not follow the beaten paths, if perchance I grow a bit personal or appear eulogistic, pray remember that for me the task is one of love, for he of whom I speak was my friend.

Of Scotch Presbyterian stock, and of a family which espoused most ardently the cause of the Union, his early years were spent in a neighborhood which was intensely Southern in sentiment. His family was forced by the exigencies and circumstances of the times to give up their holdings and move to an adjoining State in which he received his early education. It is very likely that the conditions under which his early years were spent had a great influence in making him a man of determined character, of strong prejudice, and of unswerving mind. He graduated in medicine from the old University of Louisville in 1878, having been a pupil of the

AP MORGAN VANCE, M.D., F.A.C.S.

BORN MAY 25, 1854. DIED DECEMBER 9, 1915.

CAT.

illustrious Lunsford P. Yandell. During his attendance at the university and for a short time afterwards as was the custom of the time, he was a student in the office of Dr. David W. Yandell, one of the most eminent and famous surgeons of the South.

During his period of medical studies the laws of the land were not what they are to-day and this young man, forced in a large measure to earn his own livelihood during this early period of his life, added to his income by assisting in prosecting and in furnishing the material for the anatomical laboratory. His reminiscences and recollections of these days furnish very interesting reading, and notes of these were sent some time ago to our colleague, Prof. Kelly of Baltimore, who we hope will shortly give them to the profession in permanent form.

It is quite likely that his anatomical work and his association with the Yandells did much to direct his future professional labors along surgical lines. Being a man of remarkable mechanical turn and having, as we say, probably a genius for mechanics, he sought and obtained a position as resident interne in the Hospital for Ruptured and Crippled Children in New York City. Here his genius had full sway and young as he was in years, devoid as he was in actual experience, he gave to the institution and to the profession, ideas and apparatus based upon mechanical principles of such soundness that many of them are in use to-day. He improved osteotomy, urging and demonstrating the superiority of subcutaneous and bloodless osteotomy with the chisel, over the older methods. During his entire life his natural bent was doubtless toward Orthopedics, but again the necessities of the case in a community, at the time not wealthy, and in a period before surgery had been developed as it is, compelled him to practice in the field of general surgery.

Returning to Louisville in 1881, Dr. Vance began the practice of medicine as the first specialist, south of the Ohio River, to limit his work to Surgery. You, Gentlemen, may understand and appreciate the struggles he had and the fight which he made for specialism in surgery when I say that five years later, when I first entered the study of medicine, the regularity and ethical principles of Dr. Vance's limitation of his work was still being discussed. He maintained his position, however, with dignity and firmness and aided tremendously in putting the specialty of Surgery, and those that have grown out of it, on a firm and substantial basis.

He was for years a member of the American Orthopedic Association, and at the time of his passing away, in addition to his local, county and state societies, he was an honored member of the

American Medical Association, a Fellow of the Southern Surgical and Gynecology Society, and a Founder of the American College of Surgeons.

With all his activity in his chosen profession he still found time to devote to civic duties. In our city stands, as a monument to him, a magnificent public hospital built of enduring brick and stone. In the construction of this hospital, as a result of his oversight and an earnest of his efforts, our city received a dollar's worth for every dollar of expenditure, and our poor and the hospital staff had furnished them an institution with every modern aid for the scientific investigation and treatment of disease.

Dr. Vance was married early in his professional career to Miss Mary Huntoon of Louisville, who was in deed and in fact a helpmate to him throughout his busy life. Of this marriage eight children were born, all of whom are living. He was a devoted husband and father, and in his home was dispensed a generous hospitality.

As a surgeon, he was beloved by his patients; as a man, he was the admiration of those who knew him. His ability and rugged honesty, his firmness of character, and skill as an operator, made him the ideal of the younger men in the profession. Never associated in a teaching institution he was nevertheless constantly surrounded by younger men whom he taught and who profited by his keen observation and vast experience.

Dr. Vance did not have the opportunities, during his student days, of the modern laboratories; but he attached due importance to laboratory work. He had been reared in a school which made keen observation and carefully weighed clinical data a necessity, and a pre-requisite for the exact diagnostician and for the successful operator. In both of these he was a master. He was one of the first who ardently advocated asepsis, and many were the battles which he waged in behalf of its principles. I well remember with what joy he hailed the publication of the monograph of our fellow-member, Robert T. Morris, on "How We Treat Wounds of To-day." He preached Morris to the hospital internes, he expounded asepsis to the doctors who visited his operations, he promulgated it at the bedside and in consultation. In our community he was a "power of righteousness" in all things, but he battled especially hard in behalf of the principles of asepsis. He was among the very earliest to fight in the medical forum for the recognition of appendicitis as a surgical disease, and to insist upon an early operation in

this malady. Of a quick mind, of a pleasant and masterful manner, he did much in spreading this "gospel among the heathen."

To his very intimate friends the best side of his character was shown. Ever open-handed and generous, devoid of guile, honest to a fault, loving his friends with the gentleness of a woman, as loyal to them as a mother to her child, he was always a great big rollicking boy. Those of us who had the opportunity of enjoying this close friendship have felt his loss most deeply. He was a man of tender heart, demanding his "quid pro quo" from the rich, but with his services and time always at the beck and call of the poor.

As a token of the esteem in which he was held by a large number of patients, a voluntary subscription was made in his home city, within a few days following his demise, and sufficient funds were raised to endow a large ward in our Children's Free Hospital, an institution in which Dr. Vance had done much valuable work during his lifetime and which owed its very inception and existence to him. He saw the necessity for such a hospital and by his indefatigable efforts carried his plan for this charity to successful completion. In every walk of life he played his part and played it well. Truly we may say, "Peace to his ashes; Rest to his Soul."

IN MEMORIAM

NATHAN JENKS,

BY

W. P. MANTON,
Detroit, Mich.

At all times, to record the death of the aged, ripe and full of years and possibly of honors, is no enviable task; but to put down the virtues of a comparatively young life flicked out on the threshold of potential usefulness is trying business. It was my good fortune to have known the subject of this sketch from his childhood up along the years of his development, and later to have been associated with him in his active days, and to have watched his keen endeavors to achieve the largest and the best which fortune held.

Dr. Nathan Jenks was born in Detroit, Michigan, June 3, 1872, and died in that city following a lingering illness, May 29, 1916. He came of sterling stock. His father, Dr. Edward Watrous Jenks, began life in Victor, N. Y., removed in infancy to the State of Indiana—where his father had large holdings, and founded an academy—and while still a young man, took up his residence in Detroit, where he practiced many years, winning an international reputation as an obstetrician and gynecologist. On his mother's side there is a long line of New England ancestry. Her father, the late James F. Joy, was one of the most distinguished railroad lawyers of his day in the United States, and at one time President of the Michigan Central Railroad.

Nathan Jenks was educated in the public schools of his native city; entered Dartmouth College, the Alma Mater of his grandfather Joy, and was graduated from that institution with the Degree of B. S., just sixty-six years after the latter finished his course.

The same year saw young Jenks at Bellevue Medical College, from which his father had received an *ad eundem* Degree in 1864, where he remained for two years, later matriculating in the medical department of Cornell University, which gave him an M. D. in 1899. Then followed a year of interneship in Bellevue Hospital, and finally the return to Detroit to enter practice in 1900. At the very beginning of his medical career he was deprived, by the death of his father

AMERICAN JOURNAL OF OBSTETRICS
AND
DISEASES OF WOMEN AND CHILDREN
MARCH, 1917

NATHAN JENKS, M.D.

BORN JUNE 3, 1872 DIED MAY 29, 1916

CAT.

in 1902, of that help and encouragement so important and stimulating to one just starting on an untried course. But though thus handicapped, through persistent application and intrinsic worth, he soon began to acquire patients and, before the close of his life, had built up an extensive and paying practice. Dr. Jenks was quiet and unassuming in manner and simple in his tastes; he talked but little and wrote less; but he had that faith in himself which won him many friends and ultimate success.

No duty in his line of work was too insignificant or unremunerative for his undertaking, if he felt that thereby he could lessen suffering or render helpful assistance to his patients. He was a good teacher and indefatigable in his efforts to impart whatever knowledge he possessed to his students, to make them well-equipped and grounded practitioners of midwifery. No call for assistance was ever neglected because of personal disinclination or comfort, and his pupils were loud in their praise of his self-sacrificing efforts in their behalf.

Dr. Jenks was a member of local, state and national societies, as well as of social organizations, and at the time of his death he was President of the Medical Board and Visiting Obstetrician at the Womans Hospital, and Associate Professor of Obstetrics in the Detroit College of Medicine and Surgery. In 1902 he married Miss Elizabeth C. Cady, of Detroit, by whom he had one daughter.

Early in 1912, it became noticeable that his health, never robust, was beginning to fail; but so engrossed was he in his professional and school work that he paid scant attention to his physical condition until the grim reaper had set his seal ineffaceably and it was too late. During the remaining four years of his life he put up a heroic fight which continued until the end. Although in almost constant pain—on occasions so great that, if attending a patient, he was obliged to retire to another room where he could suffer unobserved until the severity of the paroxysm had passed—he was always cheerful, full of hope and never gave utterance to complaint nor mentioned that he was otherwise than well. And though daily walking in the shadows of the valley, there was no fear in him, and he entered into eternal rest with the same brave and patient spirit which had characterized the long and dreadful period of his sufferings. Valor in war is worthy of all praise; but, in the passing show, before such unaffected fortitude we stand uncovered.

"All leave ourselves, it matters not where, when
Nor how, so we die well; and can that man that does so
Need lamentation for him?"

IN MEMORIAM

FRANK DE LOS GRAY, M. D., F. A. C. S.

BY

GORDON K. DICKINSON, M. D., F. A. C. S.

Jersey City, N. J.

As in the forest one tree pushes itself way above the others, meeting the storms, bluffed by the winds and the rains, and yet warmed by the congenial sun, thus being touched by Nature differently from the others, bringing a straighter bole and a stronger growth, so Dr. Gray, born in poor circumstances, brought up by a firm, honest father and a warm, loving mother, developed characteristics which made him a great, noble, ethical man. He was sensitive by nature, truthful in thought and word, and ever ready to take a foremost place in professional and civic life.

Frank De Los Gray was born in Riceville, Crawford County, Pennsylvania, July 17, 1857. His father, J. W. Gray, was a typical village blacksmith of a period when craftsmen took honest pride in their workmanship and were not infrequently leaders in the life of the community. He was a man of general reading, did his own thinking, and was a ready and convincing speaker. He was a hard hitter, not only on the anvil but in every cause which enlisted his sympathies. His wife, Mary Adelia Crouch, was a schoolteacher of the then frontier, whose gentle nature, broad sympathies and unpretentious piety are still remembered by the inhabitants. It was from this stock that Frank De Los Gray inherited his noble qualities and in this environment grew up, acquiring from his father the great value of truth and an irrepressible tendency to hit and to hit hard at that which was irregular; and from his mother he inherited his kindly sweet nature which never did harm to any one, never caused him to speak ill of a professional brother, and which aided in the development of the younger mind and as he met him.

His youth was passed in the peaceful hills of western Pennsylvania. At the age of fifteen years it became necessary for him to do his share in the support of himself. He was placed in charge of the

AMERICAN JOURNAL OF OBSTETRICS
AND
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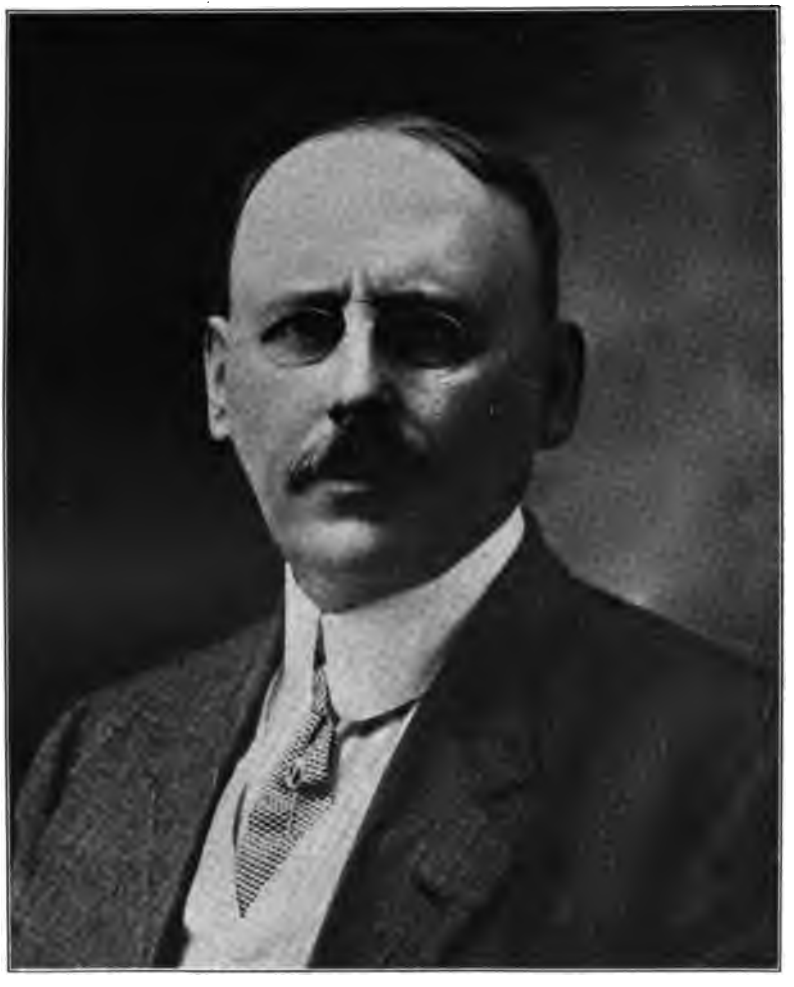

FRANK DE LOS GRAY, M.D., F.A.C.S.

BORN JULY 17, 1857. DIED JUNE 11, 1916.

CAT.

primary grade of the public school of his home town. The following year he went to the Kerrtown School, a town near Titusville, Pennsylvania, and the following year was chosen principal of the Riceville Schools. Thereafter, for several years, he alternated between teaching others and going to school himself. Like many another self-sustaining young man of that day, he found in the educating of others the readiest means of providing for his own education. It was thus that he was enabled to secure the advantages of such excellent institutions as the State Normal School at Edinboro, Pennsylvania, and Allegheny College at Meadville.

Having decided upon the practice of medicine as a profession, he chose Dr. A. P. Wald, of Spartansburg, as his preceptor, in 1879. Like many a man, who later in life became a surgeon, he was in the beginning so sympathetic in nature that the witnessing of an operation or the sight of blood would make him faint. He entered the medical department of the University of New York in 1881, and graduated in 1884. Immediately after that he was appointed interne in the Jersey City Hospital. It was here that I first became acquainted with him; he an interne, myself one of the attending surgeons.

The attending staff of that hospital were men of congenial natures. Those being the days of opinions and not of scientific medicine, opinions prevailed and were as diverse as the practitioners. This gave Dr. Gray a wonderful opportunity to pass judgment on the fads, beliefs and errors of the attending staff. One of the members, a great big, good-natured plodder in medicine, was Dr. Beriah A. Watson.

Shortly after leaving the Jersey City Hospital, Dr. Gray became Dr. Watson's assistant and his office clerk. He not only helped Dr. Watson in his practice, which was one of emergencies, but spent a great deal of his time reading and collaborating with him in literary work. Dr. Watson was a well-known surgeon; a writer of valuable medical books, and one of the pioneers in animal experimentation. Being a progressive man, he was continually the object of attacks. It was in such an office that Dr. Gray's character was developed and his skin toughened for the warfare of professional life; none was better adapted to take advantage of the military discipline and scientific outreaching which Dr. Watson always meted out, than was Dr. Gray, for he was naturally a student, very practical, slow of judgment but comprehensive in all things.

The qualities possessed by Dr. Gray, nurtured by the surroundings of his early life, naturally developed that which made him

desirable in the profession and in the community, so that it was not long before he was called upon to serve in higher and more useful capacities.

Dr. Gray married Miss Katherine Atkinson, daughter of one of the Methodist ministers of Jersey City.

In 1888 he was appointed surgeon to Christ Hospital, a small striving institution which has since grown to a position of prominence in the State. Not long after that he was made surgeon in the Jersey City Hospital, where he served his interneship. In 1901 he was appointed consulting surgeon to the North Hudson Hospital and was virtually the medical director of that institution. He remained in these two institutions until the time of his death.

Such was Dr. Gray's judgment, poise, and civic influence that, in 1906, the Mayor of Jersey City, Hon. Mark M. Fagan, appointed him a member of the Board of Health, and made him chairman of the building committee of the new city hospital. As a result of the doctor's tireless endeavors the present hospital building was erected.

Dr. Gray was one of the organizers of the Practitioners' Club of Jersey City, a club which has done more than any one influence to better conditions for and cement the members of the medical profession.

Early in his professional life he joined the County Medical Society as well as that of the State. In both he was frequently on his feet, always ready to participate in the discussion. He had a keen business sense and led in the business affairs of the societies. He had been president of the Practitioners Club; in 1915 he was made president of the State Society. It was generally conceded that his parliamentary tactics, his handling of emergencies and fair-and-square methods of dealing with matters of importance were remarkable and satisfactory.

In 1915 the County Medical Society tendered him a testimonial dinner presided over by Dr. H. Amory Hare of Philadelphia, and attended by men of prominence. It was a fitting testimonial to the worth and usefulness of the man who, in so many ways, had put his life into the public weal.

Dr. Gray was elected a Fellow of the American Association of Obstetricians and Gynecologists in 1913, and has contributed in that short time several excellent papers which brought out highly interesting and profitable discussions. The same year he became a member of the American College of Surgeons and later one of its state censors. He was also a member of the New York Chapter of the Alpha Mu Pi Omega.

Dr. Gray's literary tastes were satisfied by writing numerous papers on medical topics, all of them well studied, couched in excellent English, and covering the subject thoroughly. His papers were always filed for reference, for they were always of importance and there was never anything in them which was trivial.

Of all those we meet in the practice of medicine, none had a better idea of professional ethics than Dr. Gray. Being a gentleman, ethics came to him naturally. Being brought up by a military surgeon, his mind ran true, and his instincts and conscience always led him to do the right thing at the right time.

Dr. Gray was a lover of books. He was a man of system, orderliness and tidiness—all of which are essential qualifications of the good surgeon. He had an esthetic sense. Any one visiting his office would be impressed by the conditions there. With him mental action meant activation of the entire body. As his mind worked, his body strained. He gave to his patients not onlythought but, practically, his life.

Dr. Gray was clean in language, careful in expression, and ever ready to develop the truth. He was loyal to his friends; but loyal first to his principles. He filled a place with us that was unique.

IN MEMORIAM

JOHN BENJAMIN MURPHY, A. M., M. D., L L. D., F. A. C. S., F. R. C. S. (ENG.)

BY

CHANNING W. BARRETT, M. D., F. A. C. S.,

Chicago, Ill.

DR. JOHN BENJAMIN MURPHY, gentleman, churchman, citizen, surgeon, "founder" in the school of modern surgery, teacher, scientist, and one of our most distinguished members, has passed to his reward. Lowly of birth, struggling for position, tenacious in purpose, brilliant in achievement, he died in an active period of his accomplishment with many plans for the future unfulfilled.

Those of us who knew the man (and who of the present day did not know him) who bore the distinguished name of John B. Murphy find it difficult to identify his surname with that of the most frequent, the most typically Hibernian name of that of thousands of immigrants from the Emerald Isle; and yet this name which he carried with such knightly dignity to such a lofty height was given him by Michael and Ann (Grimes) Murphy, immigrants from Ireland and pioneers on a farm near Appleton, Wis. We would not wish to belittle or degrade the ancestry or worth of Mike and Ann Murphy, honest toilers of a pioneer soil for, certainly, if ancestry counts in the making of a man, good blood coursed through their veins for John B. Murphy lived a kingly life among his fellow men. Struggling upon the farm in those early days, fired with ambition to become a scholar he must, indeed, have been a worthy specimen of a country boy; but even the imagination of his parents and his prophetic vision must have been inadequate to perceive the full measure of his later achievements. It is said that during his first year he labored under serious handicap and that he gave very little promise, for he could neither walk nor talk. I mention this merely to call attention to the humiliation it must have been to him in after years, when he was crowding four years' work into one, to think that one whole year passed in which he never stood up before a class of students to

JOHN BENJAMIN MURPHY, A.M., M.D., L.L.D.

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hammer home the truths of surgery, or never plied an embarrassed neophyte with the baffling question "What else?" But we fancy that even in these seemingly unproductive days his dominant restless spirit was preparing for its life work by plying the question in sign language to his mother. "What else?" has been the question in answer to which he has lived his life. When he filled his young years so full of toil that even his magnificent physique felt the strain, he was wont to ask "What else?" and he was made to feel the need of vacations. When he had followed a trail as far as others had blazed the way, he was not content; but his scientific mind propounded the question "What else?" and a new fact, a better method or a shorter cut was discovered. When plying a student with questions until the student had drained his cup of knowledge dry and vainly hoped that this might be sufficient, there came the disconcerting question "What else?" When one unknown skein of surgical knowledge had been unraveled and made plain, he queried "What else?" and went on to something more intricate. When a greater measure of success came to him than comes to most men, his efforts were not slackened nor his attentions diverted. "What else?" was still his watchword. When he had measured out to the world far more than his span of years could be expected to give, his indomitable spirit drove him to the breaking point still asking "What else?" "What else can be accomplished before I have to give up?"

Dr. Murphy's life stands as a rebuke to those who think that their studies of science leave no room for the conception of God. He was true to his God and the religion of his ancestors. Nothing was more a part of Dr. Murphy than his religion. He was a faithful and devout Catholic, a strong supporter of the church and its institutions, and I think, we may rightfully observe that no layman was more widely known nor more highly esteemed. He did not find his scientific studies dwarfing his religion nor his religion interfering with his science.

Dr. John B. Murphy was born at Appleton, Wis., December 21, 1857, educated in the public schools of his community and the Appleton High School, and taught school to further his education. As a student his earnestness must have made him the pride of his teachers; but we cannot doubt that he was oftentimes disconcerting. As a teacher we cannot but believe that his pupils were treated to the best brand of zeal and enthusiasm that they had ever witnessed and no student under Dr. Murphy's medical teaching doubts that those early pupils were led to tell all they knew and more.

He entered upon the study of his chosen profession with no handicap of wealth or inherited social position. He had the early advantage of a training in necessary industry which, with a well developed, rugged endurance, fitted him for his years of endless toil which to him was a pleasure. He graduated from Rush Medical College in the class of 1879, and won the coveted "first place" as interne in Cook County Hospital, which position terminated in October, 1880. As a student and interne his career was marked by earnestness, close application with a devouring appetite for work. He had little money to spend and less inclination to frivolity. He set a new mark in hospital work that was long remembered as the "Murphy method."

He began to practice medicine in association with Dr. Edward Lee, immediately after leaving the hospital, when a little less than 23 years of age. During the next few years he, like his associate, became a strong factor in medical affairs of the Irish settlement in the Halsted and Blue Island section of the city of Chicago.

In 1882 Dr. Murphy began an eighteen month's medical study tour in Europe, returning in April, 1884, with his professional knowledge much matured. He may have had his faults; he certainly had opponents; but his career was marked by brilliant achievements from that time until his death. With his general practice in the early days, he found much of his time taken up with operations in private houses. He became known very quickly as a bold, brilliant, yet careful surgeon. Soon he began to deliver trip hammer blows against the old effete order of things, blows backed up by experimentation and clinical experience. His early contributions to the surgery of the appendix are well known. How he laid the foundation for this work in house to house surgery, when other clinicians of large experience were not recognizing a single case of appendicitis, is not so well understood. In these operations he personally supervised and helped in the cleaning of the rooms in private houses. When scarcely past 30 years of age he defended his position against the united opinions of the "powers that were," but in this sense Murphy was never young.

As we review his chief writings we find them masterpieces. It was not his nature merely to go to the bottom of a known subject. He explored intricate subjects to greater heights, deeper depths, and broader breadths. His elucidations gave them new meanings. We cannot undertake a complete review of his medical publications; but some of them stand out prominently in the making of modern surgery. Among the first to receive wide recognition were his powerful

essays on abdominal surgery: "Gunshot Wounds of the Abdomen," "Early Operation in Perityphlitis," "Early Operation in Appendicitis," "Ileus, its Diagnosis and Treatment," "Original Experimentation Researches in Surgery of the Gall-bladder and Intestinal Tract, Illustrating the Use of the Anastomosis Button." An article which has been widely quoted is the one on "Tuberculosis of the Female Genitalia and Peritoneum." His work on "Surgery of the Blood-vessels, Resection and End-to-end Union of Arteries and Veins Injured in Continuity," and his "Surgery of the Lung, Experimental and Clinical," and "Surgery of the Nervous System," were of more than ordinary interest.

In later years came his monumental works on "Osteoplasty," "Arthroplasty," and "Surgery of the Bones, Joints and Tendons." These works threw him, during the last decade of his life, into a field of arduous physical labor which called for more endurance than any other kind of surgery. If the above classical works were all destroyed there remains enough of his painstaking writings upon the surgery of the face, liver, prostate, etc., that would cause future generations to rank him with the giants of his day.

As a teacher of clinical surgery by word of mouth, he was conceded to be one of the greatest, if not the greatest, the world has produced. Into the West came Fenger with his marvelous knowledge of dead-house pathology. Out of Wisconsin came Senn with his fund of experimental pathology; but to his ripened years of teaching, Murphy brought a wealth of knowledge of living clinical pathology with a capacity for therapeutic application not surpassed, if even equalled, by either of the other two surgical giants of the middle west.

Dr. Murphy was not only an individual worker but a strong factor in organized medicine. He was a member of local, state, national and many special societies. He was president of The Association of Military Surgeons, The Chicago Medical Society, The American Medical Association and the Clinical Congress of Surgeons. He was a life member of the Deutsche Gesellschaft für Chirurgie, honorary member of the Sociètè Chirurgical de Paris, and Fellow of the Royal College of Surgeons, London. He received the great distinction and honor of being made Knight of the Order of St. Gregory by the Pope.

Wherever Dr. Murphy appeared upon the platform or floor in medical gatherings, he was a commanding figure, and master of the situation. While presiding at the meeting of the Clinical Congress of American Surgeons, London, 1914, one of the suffragettes, who at

that time attracted a good deal of attention in England, forced herself before the meeting, took the floor, and well nigh put the essayist speaking to rout. Dr. Murphy quietly directed her removal. One of the Fellows, a tall and stalwart figure, took the lady gently upon his arm, like a father would his child and carried her out of the hall. Murphy then walked to the front of the platform and with impressive dignity said: "Gentleman, it is the opinion of your chairman that the previous speaker was out of order." This unexpected sally led to prolonged applause followed by an orderly return to the work of the evening.

With Dr. Murphy every hospital position has been a teaching position and in this line of teaching his greatest work has been done at Cook County Hospital, Alexian Brothers Hospital, and Mercy Hospital, with the latter of which hospitals his chief clinical work has been connected in the last decade.

He has been connected with the College of Physicians and Surgeons, Rush Medical College, and was the Surgeon at the Northwestern University Medical School at the time of his death. He was a tremendously forceful teacher and, perhaps, no man in this country has left a greater impression upon his students. His death is a loss to the clinic in Mercy Hospital and will be felt by the medical students of that section as well as by the visiting surgeons from all parts of the globe.

What manner of man was Dr. Murphy that he could accomplish these things? He was a man of commanding figure of more than average height; erect and alert, physically and mentally, at all times. He was always kind, at times warm, frequently witty, and yet serious. There was too much to be done to be frivolous. His mind was fertile, adaptable, penetrating and analytic. He was possessed of what might be termed organized restlessness. He seemed ever to be doing. He was a human dynamo. No little of his great achievements were made possible by his ability to organize his assistants to do much of the detail. He planned his life so that his family and associates could tell within a few moments what he would be doing; all adjusted themselves to those few mnutes so that no time was lost. It is to be regretted that these plans left no moments for systematic relaxation and exercise.

He had a directness in reaching and dealing with patients that sometimes did not take account of the "other fellow" although it must be said that it was seldom, if ever, to the patient's detriment. These methods of directness were sometimes in question, but the tremendous respect of the profession for his ability usually over-

weighed the criticism. In spite of criticism, he exerted a magnetism that was contagious. He drew the loyal respect of the profession, he attracted the attention of laymen and drew help from the lay press as has no other man in Chicago and, with one or two exceptions, as has no other man in the country. For this he had his critics, but his inherent worth to the world and to the profession is not obscured by this subtraction.

In the operating room he bristled with cold efficiency. He had no patience with a man or instrument that failed to do his or its work at the right time. He believed in efficiency to the extent of having every useful appliance backed up by another of the same kind regardless of cost. In the dressing room he was careful and thorough. His hospital walks were marked by hurried suggestions of optimism; his office work was businesslike. In his home much of his time was taken with dictations and consultations with his helpers and collaborators; and yet here he relaxed and the embers of his nature glowed warm, and tender and bright.

In November, 1885, when 28 years of age, Dr. Murphy married Miss Jeannette C. Plamondon of Chicago. To them were born five children, Harold and Jeannette dying in infancy, Cecille J., Mildred L., and Celeste remaining.

Dr. Murphy, as has been pointed out, was a tireless, ceaseless worker; but at his side has ever been Mrs. Murphy, brilliant, devoted and helpful; together they have achieved, and while they were well known in society, he has never divorced himself from his work to become a club or society man.

After a summer of failing health, Dr. J. B. Murphy passed away on August 11, 1916, at the age of 58 years. No greater evidence of the esteem in which he was held could be offered than the sight of the host that gathered at his funeral.

To those who have been fortunate in knowing Dr. Murphy, these lines are unnecessary and perhaps disappointing. They not only know that he was a great surgeon and teacher, but they know that he would have been great in any work big enough to absorb his interest. To those who have not known him, and those who shall see his name in after years, we would say that Dr. Murphy stands in our minds in stature, in character, in restless energy, in analytic and penetrating mind, in devotion to duty, in self-reliance, in scientific honesty, in brilliant achievement, a superb example of the best type of surgeon of his day. If you ask me how to become a great surgeon, I could well say: Study carefully the life of John Benjamin Murphy and do likewise.

INDEX

Abdomen, differential diagnosis of diseases of the upper quadrant of, 246
Abdomen, gunshot wounds of the, in pregnant women, 48
Abdominal hysterectomy, the technic of, 280
Abdominal surgery, relation of so-called ether pneumonia to, 328
ABRAMS, EDWARD THOMAS, xxxiii
Abscess, appendicular, complication, hemorrhage, followed by death, 5
Animated drawing, applying the, to the teaching of surgical technic, 231
Appendicular abscess, complication hemorrhage, followed by death, 5
Appendix, removal of the, for the cure of trifacial neuralgia, 111

BACON, JOSEPH BARNES, xxxiii
BAINBRIDGE, WILLIAM SEAMAN, xxxiii, 104, 153, 223, 255, 265, 278, 303, 316, 319
BALDWIN, JAMES FAIRCHILD, xxxiii, 280
BANDLER, SAMUEL WYLLIS, xxxiii
BARRETT, CHANNING, W., xxxiii, 136, 173, 332, 402
BAUGHMAN, GREER, xxxiv
BELL, JOHN NORVAL, xxxiv, 24, 40
Bile duct, excessive drainage complicating surgery upon the, 258
BILL, ARTHUR HOLBROOK, xxxiv
Blood pressures, observations on, during operations, 74
BONIFIELD, CHARLES LYBRAND, xxxiv, 22, 103, 134, 153, 315, 316, 326, 351
BOSHER, LOUIS C., xxxiv
BOYD, JAMES PETER, xxxiv
BRANHAM, JOSEPH H., xxxv
Breech presentation, is the operation of Cesarean section indicated in the delivery of?, 359
BROWN, GEORGE VAN AMBER, xxxv, 20, 152, 318
BROWN, JOHN YOUNG, xxxv
BROWN, WILLIAM MORTIMER, xxxv
BUTEAU, SAMUEL H., xxxv

Cancer, uterine, surgical treatment of, 218
Carcinoma, cavity, heat as a method of treatment in some forms of, 207
Cardiovascular disease, 118
CARSTENS, J. HENRY, xxxv, 18, 37, 46, 79, 81, 107, 127, 253
Cavity carcinoma, heat as a method of treatment in some forms of, 207
Cesareanized women, rupture of the uterus in, 24
Cesarean scar, rupture of the, 28
Cesarean section indicated in delivery of breech presentation, 359
Cesarean section, postmortem, 42
CHANDLER, GEORGE, xxxv
Chronic intestinal stasis, 303

CLARK, EDMUND DOUGAN, xxxv, 290
Colon, descending and pelvic, diverticulitis of the, 268
CONGDON, CHARLES ELLSWORTH, xxxvi
CRILE, GEORGE W., xxxvi, 155, 226, 261
CROSSEN, HARRY STURGEON, xxxvi
CROTTI, ANDRE, xxxvi, 353
Cyst, strangulated ovarian, simulating appendicitis, 371
Cystocele and prolapsus uteri, treatment of, 363

DARNALL, WILLIAM EDGAR, xxxvi, 328, 335
DAVIS, ASA BARNES, xxxvi
DAVIS, JAMES ETHELBERT, xxxvi, 20, 38, 72, 105, 128, 177, 255, 316, 333
DAVIS, JOHN D. S., xxxvi, 56, 152, 246
DICE, WILLIAM GORDON, xxxvii
DICKINSON, GORDON K., xxxvii, 45, 73, 79, 80, 99, 254, 262, 264, 301, 326, 331, 337, 352, 398
Digital rotation in occipitoposterior positions of the vertex, 376
Diverticulitis of the descending and pelvic colon, 268
Drainage, excessive, complicating surgery upon the common bile duct, 258
Drainage for pus conditions in the pelvis during pregnancy, 8
Drawing, animated, applying to the teaching of surgical technic, 231
Ducts and glands, major vestibular, 177

EASTMAN, THOMAS BARKER, xxxvii
ELBRECHT, OSCAR H., xxxvii, 20, 23, 46, 106, 107, 110, 115, 135, 267, 277
ERDMANN, JOHN FREDERICK, xxxvii
Ether pneumonia, relation of, to pelvic and abdominal surgery, 328
Extract, lymph gland, 67

Fibromyomata uteri and cardiovascular disease, 118
FINDLEY, PALMER, xxxvii, 36, 129, 137
FOSTER, CURTIS SMILEY, xxxvii
FRANK, LOUIS, xxxviii, 363, 392
FREELAND, JAMES ROY, xxxviii
FURNISS, HENRY DAWSON, xxxviii

Gastroenterostomy, mechanics of the stomach after, 234
GILLETTE, WILLIAM J., xxxviii
Gilliam operation, a modified, 156
Glands, tuberculous, of the mesentery, 318
Goiter and pregnancy, 353
GOLDSPOHN, ALBERT, xxxviii, 101, 156, 174, 255, 334
GOODMAN, SYLVESTER, xxxviii, 19
Gray, Frank De Los, in memoriam, 398
Gunshot wounds of the abdomen in pregnant women, 48
Gynecological operations, standardization of definite procedures during, 145

HADDEN, DAVID, xxxviii, 67, 73
HAGGARD, WILLIAM DAVID, xxxviii
HALL, JOSEPH ARDA, xxxix
HALL, RUFUS BARTLETT, xxxix, 15, 20, 21, 22, 23, 223

HAMILTON, CHARLES SUMNER, xxxix
HARRAR, JAMES AITKEN, xxxix
HAYD, HERMAN EMIL, xxxix, 40, 66, 114, 135
Heat as a method of treatment in some forms of cavity carcinoma, 207
HEDGES, ELLIS W., xxxix
Hernia, inguinal, attached to cord, 290
HILL, ISADORE LEON, xxxix
Hospital management, 337
Hospital, surgeon's responsibility to the economics of the, 342
HOWITT, HENRY, xl
HUGGINS, RALEIGH RUSSELL, xl, 78, 127, 261, 296, 350
HUMISTON, WILLIAM HENRY, xl, 102, 107, 144, 172
Hysterectomy, abdominal, the technic of, 280

ILL, CHARLES L., xl
ILL, EDWARD JOSEPH, xl, 18, 46, 135
Ileus, postoperative, absence of muscular tone an important etiological factor in, 296
Inguinal hernia attached to cord, undescended testicle, uterus tubes and broad ligaments, 290
Interposition operation of Watkins-Wertheim, 363
Intestinal stasis, chronic, 303

JACOBSON, JULIUS H., xl, 126, 218, 225, 230, 234
Jaundice, value of, in differential diagnosis of diseases of abdomen, 246
Jenks, Nathan, in memoriam, 396
JONAS, ERNST, xl
JONES, ARTHUR THOMAS, xli, 318, 326

KEEFE, JOHN WILLIAM, xli, 151, 268, 278, 331
KENNEDY, JAMES W., xli
KING, JAMES E., xli
KIRCHNER, WALTER C. G., xli

LANGFITT, WILLIAM STERLING, xli
LEIGHTON, JR., ADAM P., xli
Ligaments, round, shortening of the, 165
LITZENBERG, JENNINGS, xlii
LONGYEAR, HOWARD WILLIAMS, xlii
LOTHROP, EARL P., xlii
LOTT, HENRY STOKES, xlii, 368
Lymph gland extract. Its preparation and therapeutic action, 67
LYNCH, JEROME MORLEY, xlii
MCCLELLAN, BENJAMIN BUSH, xlii, 118, 128
MCMURTRY, LEWIS SAMUEL, xlii
MCPHERSON, ROSS, xliii, 359
MANTON, WALTER PORTER, xliii, 396
MARVEL, EMERY, xliii, 265, 342
Mechanics of the stomach after gastroenterostomy, 234
MEEKER, HAROLD DENMAN, xliii
Mesentery, tuberculous glands of the, 318

MILLER, AARON BENJAMIN, xliii
MILLER, JOHN D., xliii
MOOTS, CHARLES W., xliv, 74, 79, 80
MORIARTA, DOUGLAS C., xliv, 138, 144
MORRIS, LEWIS COLEMAN, xliv
MORRIS, ROBERT TUTTLE, xliv
Mortality and morbidity, surgical, 92
Murphy, John Benjamin, in memoriam, 402
Muscular tone, absence of, an important etiological factor in postoperative ileus, 296

Neuralgia, trifacial, removal of the appendix for the cure of, 111
NOBLE, GEORGE HENRY, xliv
NOBLE, THOMAS BENJAMIN, xliv
Nulliparous women, prolapse of the uterus in, 129

Observations on blood pressures during operations, 74
Obstetrics, teaching, under improved conditions, 58
Occipitoposterior positions of the vertex, digital rotation in, 376
OLMSTED, INGERSOLL, xliv
Operation, considerations in the care of our patients before and after, 85
Operation, modified Gilliam, and its results, 156
Operations, gynecological, standardization of definite procedures during, 145
Operative judgment as a factor in surgical mortality and morbidity, 92
Ovarian cyst, strangulated, simulating appendicitis, 371

Pain, value of, in the differential diagnosis of diseases of abdomen, 246
PANTZER, HUGO OTTO, xliv, 1, 23, 256, 325
Patients, care of, before and after operation, 85
PECK, GEORGE AUGUSTUS, xlv, 266, 267, 376
Pelvic and abdominal surgery, relation of so-called ether pneumonia to, 328
Pelvic troubles, points in the diagnosis of, 81
PERCY, JAMES FULTON, xlv, 207, 224
PFAFF, ORANGE G., xlv, 42, 46, 47
Placenta, premature separation of the normally situated, in latter months of pregnancy, 384
Pneumonia, so-called ether, relation of to pelvic and abdominal surgery, 328
PORTER, MILES F., xlv
Postmortem Cesarean section, 42
Postpuerperal sterility, 368
POTTER, IRVING WHITE, xlv, 39
POUCHER, JOHN WILSON, xlv
Pregnancy, drainage for pus conditions in the pelvis during pregnancy, 8
Pregnancy, goiter and, 353
Pregnancy, premature separation of placenta in latter months of, 384
Pregnant women, gunshot wounds of the abdomen in, 48
President's address, 1
Prolapse of the uterus in nulliparous women, 129
Pus conditions in the pelvis during pregnancy, drainage for, 8

Radium—a palliative, 138
REDER, FRANCIS, xlv, 8, 143, 144, 334, 351
REED, CHARLES ALFRED LEE, xlv
RONGY, ABRAHAM JACOB, xlvi, 28, 40, 134
ROSENTHAL, MAURICE I., xlvi, 39, 111, 116, 173
Round ligaments, shortening of the, 165
RUNYAN, JOSEPH PHINEAS, xlvi
Rupture of the Cesarean scar, 28
Rupture of the uterus in Cesareanized women, 24
Rupture of the uterus; sepsis; operation; recovery, 15
RUTH, CHARLES EDWARD, xlvi

SADLIER, JAMES EDGAR, xlvi, 258, 267, 333, 350
SANES, K. ISADORE, xlvi
Scar, Cesarean, rupture of the, 28
SCHILDECKER, CHARLES BUSHFIELD, xlvi
SCHWARZ, HENRY, xlvi, 17, 21, 38, 46, 58, 80
SCOTT, N. STONE, xlvii
SELLMAN, WILLIAM ALFRED BELT, xlvii, 100
SHERRILL, JOSEPH GARLAND, xlvii
Shortening of the round ligaments by transverse suprapubic incision, 165
SIMPSON, FRANK FARROW, xlvii
SKEEL, ARTHUR JULIUS, xlvii, 19
SKEEL, ROLAND EDWARD, xlvii, 92, 115, 141
SMEAD, LEWIS FREDERICK, xlvii, 48, 263
SMITH, CHARLES NORTH, xlvii
SMITH, LEWIS WATSON, xlviii
SMITH, WILLIAM S., xlviii
STARK, SIGMAR, xlviii, 115, 133, 135, 142, 165, 175, 265
Stasis, chronic intestinal, 303
Sterility, postpuerperal, 368
STEWART, DOUGLAS HUNT, xlviii
STILLWAGEN, CHARLES A., xlviii
Stomach, mechanics of the, after gastroenterostomy, 234
Stomach, surgery of the, 226
Strangulated ovarian cyst simulating appendicitis, 371
STRASSER, AUGUST ADRIAN, xlviii
Surgeon's responsibility to the economics of the hospital, 342
Surgery of the stomach, practical consideration of, 226
Surgical mortality and morbidity, 92
Surgical technic, applying the animated drawing to the teaching of, 231
Surgical treatment of uterine cancer, 218
SUTCLIFFE, JOHN ASBURY, xlviii
SWOPE, LORENZO W., xlviii

TATE, MAGNUS ALFRED, xlviii, 5, 155, 316
Teaching obstetrics under improved conditions, 58
TORRANCE, GASTON, xlix
Trifacial neuralgia, removal of the appendix for the cure of, 111
Tuberculous glands of the mesentery, 318
Tumor mass, value of, in differential diagnosis of diseases of abdomen, 246

Uteri, fibromyomata, and cardiovascular disease, 118
Uterine cancer, surgical treatment of, 218
Uterus, a case of rupture of the, 15
Uterus, prolapse of the, in nulliparous women, 129
Uterus, rupture of the, in Cesareanized women, 24

Vance, Ap Morgan, in memoriam, 392
VANDER VEER, ALBERT, xlix
VANDER VEER, EDGAR ALBERT, xlix, 371
VAN SWERINGEN, BUDD, xlix
Vertex, occipitoposterior positions of the, 376
Vestibular ducts and glands, pathology of the, 177

WADE, HENRY ALBERT, xlix
WALDO, RALPH, xlix
WALKER, EDWIN, xlix
Watkins-Wertheim, interposition operation of, 363
WEISS, EDWARD ALOYSIUS, l, 145, 155, 223
WELTON, THURSTON SCOTT, l
WERDER, XAVIER OSWALD, l, 222
WEST, JAMES NEPHEW, l
WESTMORELAND, WILLIS FOREMAN, l
WHITE, GEORGE R., l
WING, LUCIUS ARTHUR, l, 384

YATES, H. WELLINGTON, l, 85, 108, 110

ZEIGLER, CHARLES EDWARD, li
ZINKE, ERNST GUSTAV, li, 21, 254, 315, 326

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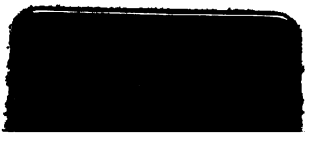

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